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Hydrostatics Applied to Revolving Iron Forts.

So long as human nature is governed by ambition and the pursuit of gain, whether in individual enterprize or for national agrandizement, so long shall we be subject to wars with their attendant calamities; and while these results are inevitable we should guard against the consequences by being on the alert for the foe.

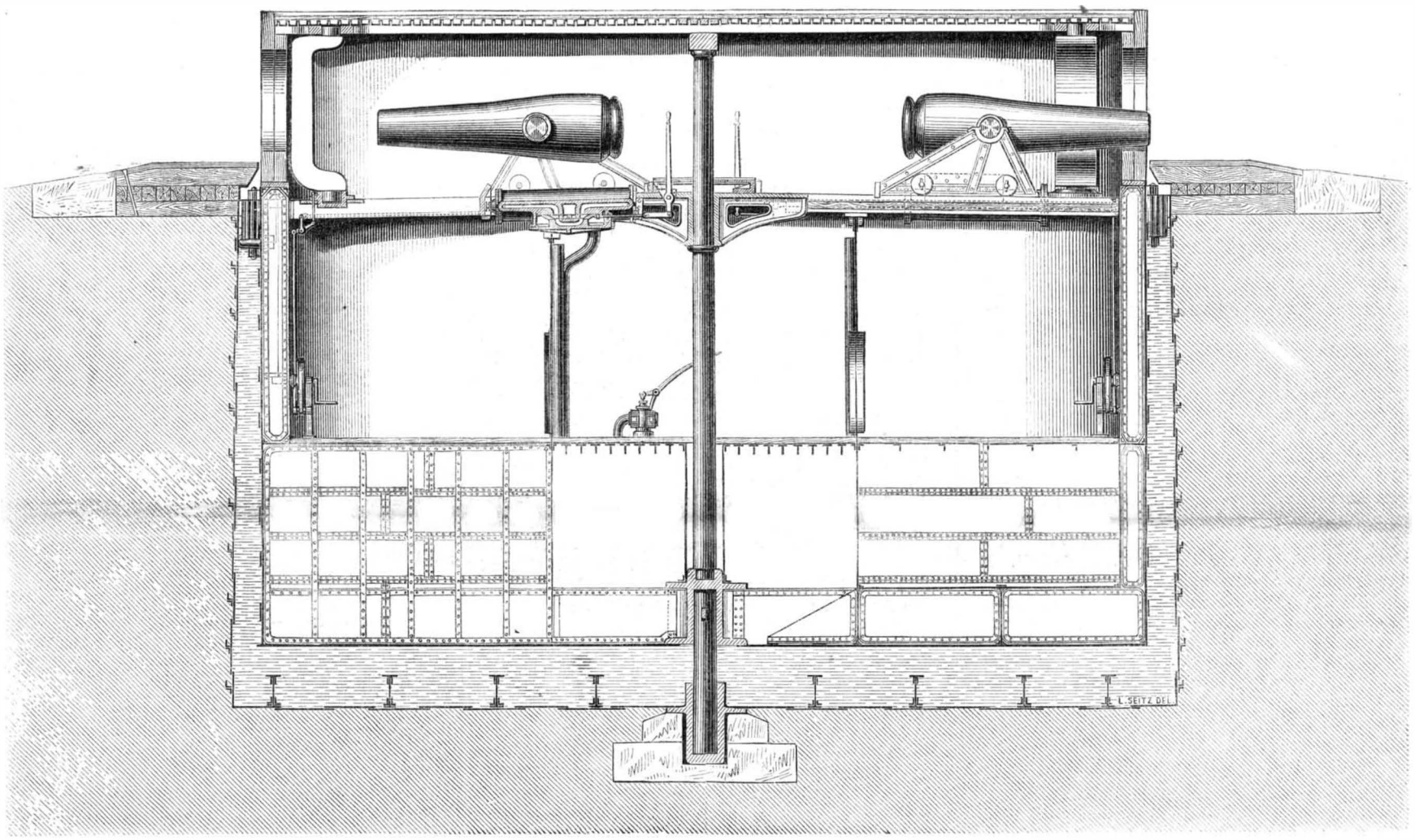
We now see all the most enlightened nations of the world constantly experimenting, planning, and devising the best means of defence and offence; we see the best moral, military, scientific, and mechanical minds more or less brought to bear upon these two problems: How best to defend ourselves against an enemy's ships; how best to assail an enemy with ships.

Of late the science and skill in the manufacture of large guns is so far in advance of the power of resistance in ships when they are clad up to their maximum load, that they are not at all reliable; and the old fortifications are still more unreliable; hence the necessity of corresponding improvements in forts and other means of defence. When our largest guns consisted of 68 pounders, it was but pastime for the brick mason and stone cutter to construct fortifications. But now 600 or 1000 pounders have reduced all such fancy structures to worthlessness. It is now guns *versus* forts, iron and steel against iron and steel. But the iron-clad is now more than a match for the old fort, and iron plating has heretofore proved a failure, therefore we see great energy and anxiety exhibited by foreign nations to protect their fortifications. To preserve their guns in barbette they mount revolving turrets on the top, and in the angles of their forts, but this as a naval defence will probably prove a useless experiment. Other experiments are proposed, such as adopting "rifle pits" on a large scale, with guns so mounted that they "get themselves up and fire over the top of the pit and then get themselves down again to be reloaded;" and, lastly, it is proposed to mount a miniature fort on trucks to be propelled by a locomotive engine; this locomotive fort to travel on an annular inclined railway, coming round from behind a shield or casement moving up the incline and firing over the embankment, and then gracefully retiring. These somewhat novel devices tend to show the drift of the practical mind, the utter incapacity of the present mode of constructing fortifications, and the consciousness that something must be done, and that soon, to solve these two great problems; yet no two engineers can agree, but leave them, as they found them, unsolved. We know, too, that the very existence of some Governments depends on the solution of one or the other of these problems. We know that Governments that ve the most forts, really have the least confidence in them, and are surrounding them with iron-clads, floating batteries, and torpedoes. One writer says that the British Admiralty have made a "lamentable failure of the Plymouth forts and Gibraltar shields," and it is well known that in some cases they plate the tops of the fort, leaving the base exposed, when they know by actual experiment that a single shot has "splintered" granite blocks fifteen feet back from the face, or point of impact. Naval tactics are being reversed; forts were formerly used to protect ships, but now ships have to protect forts, such as they are. Doubtless the true theory is mutuality; one auxiliary to the other.

In view of these facts it is claimed that the Revolving Hydrostatic and Pneumatic Fort satisfactorily solves the first problem; how best to defend ourselves against an enemy's ships. Accompanying this article will be found a plan, reduced from working drawings drawn to a scale, to admit of eight 15-inch guns, and is 58 feet diameter on the gun deck. It gets its flotation by being inclosed in an iron tank, say two feet greater in diameter than the bottom section of the fort, having the intermediate space filled with water, or, in very high latitudes where there is danger of freezing, oil may be used. The upper section or fort proper is constructed entirely of iron or steel plates of any given thickness; in this plan it is proposed to use three thicknesses of six-inch plates, which are now considered sufficient to resist any projectile that has been contemplated. It is only a question of buoyancy, whether this fort be one foot or four feet in thickness, which is governed by the superficial area of the base or lower section immersed, so that, it will be seen, this system is unlimited in its capacity. The lower section is divided off into store rooms for provisions and ammunition, and into quarters for officers and men.

A fort of this kind weighing 1,500 or 2,000 tuns may be revolved easily with three or four men by simply turning a crank, thus enabling us to handle eight 15-inch, 20-inch, or 30-inch guns.

Suppose science and mechanical skill should produce wrought iron or steel guns of 50 tuns or more, with a 24 or 30-inch caliber, which may be considered at least possible, they could not be used on board of ships, nor do we think they would be practical in the present fortifications; but on this hydrostatic principle such guns can be trained as expeditiously as guns weighing only ten tuns; and by an ingenious arrangement of compressed air, which takes up the recoil of the monster pieces and runs them again into battery by the power of a single arm—together with other appliances to facilitate loading, opening and closing the port stoppers—Captain Ryan's system insures a great saving of men and time. And it will be borne in mind that this revolving fort effectually counteracts the advantage heretofore held by ships under steam and constantly in motion while in the act of bombarding; for this fort can also be kept in constant motion, so that the lateral range when got, need never be lost on a moving ship—overcoming the most difficult part of gunnery in fortifications. This fort can also be located in positions where it would be almost impossible to erect an ordinary fort; as for instance, in low marshy land or on quicksand, this fort may be set up in a few days by simply excavating a pit large enough to receive the iron tank, when the foundation is ready for an eight gun fort, equivalent to a 50 gun fort of the present construction; and if it be exposed to attack from land, it still maintains its permanence as a defensive work, as nothing short of insanity could induce infantry to assault such a fortress; for so long as provisions and ammunition hold out a garrison of fifty men in its iron shield could never be made to surrender. The attack of a siege train would be quite as futile; starvation or treachery might capture one of these forts, but powder and ball never.



RYAN & HITCHCOCK'S REVOLVING IRON FORT.

All the advantages pertaining to the revolving fort may be transferred to a floating battery by constructing a solid timber platform or shield 150 feet square, more or less, from 12 to 20 feet deep, with proper fastenings, and plated with iron, to be ram and shell proof, leaving in the center a well-hole through the shield of requisite diameter to receive the fort, in which case it will be seen that the timber shield is a substitute for the iron tank, with this difference that it has no bottom but the sea. In case of necessity this immense shield is towed into position and securely moored. To an obstruction of this kind rams and iron-clads will give a wide berth. With a few of these eight-gun batteries moored in the Narrows and East River, well supported with the revolving forts on either shore, New York can safely defy all the rams and iron-clads of the world. "In peace let us prepare for war," but in time of peace it is not necessary to construct these timber shields, but it would be prudent to construct the iron battery or turret so far as fitting it up, then taking it down and storing it for future use. Beside the intrinsic value of this battery, it gives additional facilities for using torpedoes or other submarine works.

War is expensive at best, and war machinery is growing more and more expensive, but expenses are not taken into consideration as against a nation's existence, safety, or means of defence; in fact it is maintained by some of the most enlightened minds of the day that the more expensive and elaborate the defensive works required, the greater the safety against invasion, therefore the cheapest, which is doubtless the true theory, especially for iron-producing states.

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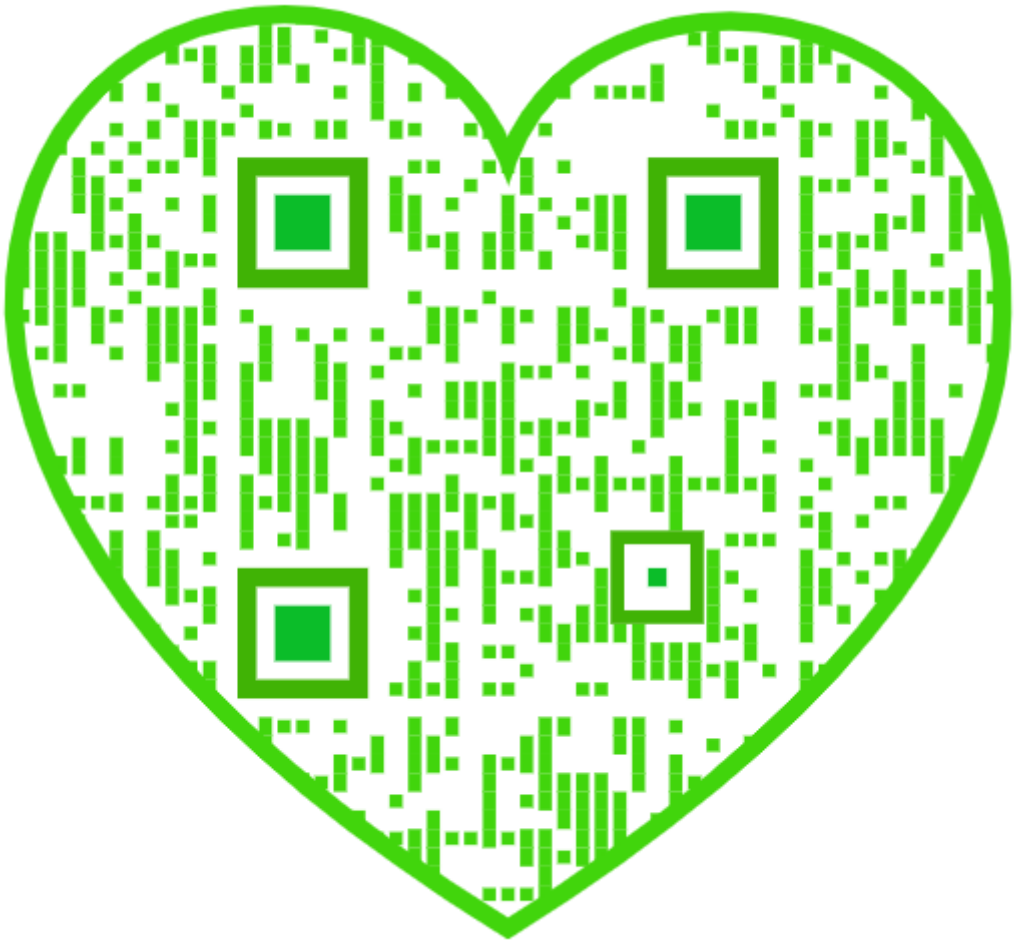

But this does not prove that cheaper engines of war may not be devised, and still be more effective. That this system of defence is the cheapest may be demonstrated by comparison with the cost of one of the British iron-clads. Let us take the *Minotaur*, which was built as a model war ship, fully up to the times. The weight of her hull alone is 7,586 tuns —five times more than this fort. Armor and backing 6,124 tuns—four times more than the fort; engine and coal 2,540 tuns —more than half as heavy again; making, exclusive of armament, 16,250 tuns, within a fraction of ten times the weight of this fort. The hull alone cost £365,365; with double armor and backing, would cost £757,350—equal to about $3,756,750. But the *Bellerophon* is claimed to be an improvement, though smaller and lighter, with a saving of a quarter of a million pounds. These statements are taken from a paper read by Mr. Reed before the Royal Society, London. We are not prepared to say just what this fort will cost, but other things being equal, it will be nearly in proportion to their respective weights, not exceeding $400,000, or about one tenth of the *Minotaur*; and it would be safe to say that our Government could build ten forts and equip them for action, for every single iron-clad of this type that any foreign Government could build and send against us, at the same time the commander of such iron-clads might hesitate to attempt to pass two of these forts and one battery properly located in the Narrows below this city.

But the construction account is not the only or most unfavorable comparison, the cost of maintaining these sea monsters on a war footing is simply enormous, to say nothing of the deterioration, even when laid up in ordinary.. It requires a strong detail of officers and men to keep them afloat and in repair, whereas this fort is never in danger of sinking, or getting out of repair in its machinery, and in time of peace these forts are to be laid up, by drawing off the water and allowing the fort to settle down on its ways, when the iron has only to be protected from oxidation, and a detail of one man to a fort would be a sufficient guard. When in a case of emergency, by having connection with a reservoir, in twenty minutes the fort could be set afloat, all in fighting trim. Neither is this all the saving by this system, as in case of the batteries they may be manufactured to order (exact duplicates), and stored in all the arsenals and seaports, when, if occasion requires, they could be put into working order with all their equipments in thirty days, more or less, according to the emergency.

The discrepancy between their respective powers of offence and defence, may be presented in a few words. The forts are to be absolutely impregnable against any and all shot that can be hurled against them; each one armed with a battery of eight or more guns, double, or perhaps quadruple the weight that will be carried by any iron-clad; with projectiles in proportion, delivered with almost the accuracy of a rifle marksman, at the rate of one every minute, against the sides of a ship made of iron and wood, probably in its strongest parts equivalent to eight inches of iron; for it must be remembered that ships of this type are not entirely clad with iron, the exposed parts being of about the same value for defence that a cigar box would be to a minie ball. Nor would their iron plating amount to much more in resisting projectiles of 500 or 1,000 pounds, propelled with from 100 to 200 pounds of powder; and it remains to be seen what effect a thousand pound shell would have, exploded alongside of an iron-clad, charged with fuminating powder, gun-cotton, or nitroglycerin. Doubtless the ship would be relieved of some of its iron plates. Of course no nation will ever send ships to fight such forts, but only to pass them, if they could.

Further information may be obtained by addressing James T. Ryan, St. Nicholas Hotel. Patent pending.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Is the Age of Invention at a Stand Still?

MESSRS. EDITORS:—A period of forty years past may be termed the "Age of Invention." We can compare the present with the past: the old stage-coach, or diligence, in Europe, with the steam locomotive of to-day; the old sail ships with the present steamships. We can find in our mother's list of old letters large foolscap sheets, sealed by wax—no envelopes—and bearing date four or five weeks from that at which they were received; and we can compare these missives with those transmitted by our present postage system and the telegraph. We call to mind, also, the great improvements in the art of printing. Then glance at the machinery used in the department of agriculture—mowing machines, horse rakes, reapers, thrashers, plows, cultivators, etc.—and consider the manual labor of forty years ago. The department of war, with ironclads, breech loaders, etc., furnishes a striking comparison. The household, with sewing machines, washing machines, and a number of minor labor-saving machines, still adds to the comparison. We could continue in this strain indefinitely, but we are led to the question: "*Is the age of invention at a stand still?*" That is, will there be, in the coming forty years, so great an improvement in the modes of transit as there has been in this past forty years? Will there be as wonderful an improvement in the means of transmitting messages? What improvements are we to have in the arts? Is the science of to-day to be still more revolutionized? Will the farmer be aided as much in the future as he has been in the past? Is the age of invention at a stand still? Forty years from now will tell! Inventors, have you among you a Stephenson, a Watt, a Jacquard, a Morse, a Fulton, and a Howe? Will there be with you, forty years to come, an Ericsson or a Hoe? Your deeds are to be inscribed on the tablet of time. Will your names stand in the list alongside of these illustrious ones? The field is large, and it is merely fenced in—the space is open, and rich crops will repay the tilling!

We hazard an answer that the coming forty years will witness some marvelous improvements. That wonderful agent, electricity, is only yet half harnessed. We now, for a few cents, send word to, and hear from friends a thousand miles away, it being inconvenient only as regards time. Will we not, some day, sit down to a family telegraphing machine and send messages by lightning, without the bother of the mail, and the inconvenience of writing at all?

We speed over the ground, "rattling over bridges," whizzing through the forest, journeying from New York city to San Francisco in seven days; but will it be done in seven hours? No! is the answer of to-day. An old authority on railroads, Wood, in 1825, wrote in his able work: "Nothing can do more harm to the adoption of railroads than the promulgation of such *nonsense* as that we shall see locomotive engines traveling at the rate of 12, 16, 18, and 20 miles per hour!" A later authority on this subject has added, "an express train on the Great Western Railway, drawing 59 tuns, has traveled, for three hours, at the rate of 63 miles per hour!" (Ritchie on Railways). Comment is unnecessary. Will the Pneumatic process of transmission effect the coming great stride from seven days to seven hours, for time across the continent? *Why not?* No running off the track; no collisions! Really, the "coming man" need not drink in going from New York to California!

Look around you, inventors, and see the endless labor yet to be saved. A thousand and one wants stare you in the face. Steam is yet to be half utilized. Who is the coming man for this? Is it Ericsson with the solar heat and "Sun engines?" Why, almost at the moment of writing, a sewing machine is being bothered with, because it pulls the work, from the fact that all machines are defective in that the feed is only at one side of the work. Who is the coming man for this?

There is no end to the wants of the present day. Will the next forty years supply them all? Time will tell. N. F. P.

Paterson, N. J.

Burning of Powder in Fire Arms.

MESSRS. EDITORS:—I notice in No. 21, current volume of SCIENTIFIC AMERICAN, page 330, an article headed "Carefulness in the Management of Fire Arms." Now, I perfectly agree with you as to the necessity of keeping a gun clean, but differ with you in other respects. I am over fifty years old and have made gunnery my business, making many experiments. The dirt that collects in a gun barrel will not explode or burn, even by bringing a red hot iron in contact with it. You carry the idea that only a limited amount of powder will burn, and that a gain twist will foul more at the muzzle than at the breech. This is the case with the breech loader, but with the muzzle loader the dirt is driven down at each loading, and if you are able to get your ball down to the powder there will be no danger of bursting the gun.

Now I will give a detail of an experiment that I made about ten years ago in Marshall, Michigan. I spent one day with three men to assist me. I had a heavy target rifle, cast steel barrel, weighing 32 lbs., and carrying 120 round balls, or 50 conical slugs to the lb., and the slugs were one inch long. It was a fine, still morning in the winter, after a snow that fell that night without drifting. I measured accurately one half mile on the ice of the Kalamazoo millpond, and commenced with a light charge of powder after first driving a slug ball through the barrel with the breech pin out, and saving the ball in order to compare it with those fired at the target, but not hitting anything but skipping along in the soft snow until finally they would stop without a scratch or a bruise, just as they left the rifle. After finding one from the first or small charges, I increased my powder half an inch more in depth in the barrel, and throwing clean snow in front of the gun in order to detect if any powder was thrown out unburnt, and then adjusting my sight until I could hit the target. I kept on in this way until I used six inches of powder in depth, measuring from the breech at each charge. The result was that each half an inch of powder raised or carried the ball about three feet higher at each increase of charge, and no more dirt in front of the gun; and each successive ball or slug was stove up, or more properly "upset," and showed the impression of the grooves or rifling still further up, until the last filled them from butt to point. Now this proves not only that all the powder burns, but burns instantly before the ball starts, or else it would not upset it any more with a large charge than a small one. I think it impossible to throw out a single grain of powder if you filled the barrel full with a ball on top of it to confine it; for before the pressure of the gas comes against the ball the fire has found its way between the grains to the utmost extremity of the place of confinement; and for this reason, in blasting rocks every grain must explode before anything gives or else there would be no need of more powder for a deep heavy blast than for a light one. But powder when not confined acts differently, for when the first grain ignites it has plenty of room to escape without being forced through the other until it catches from one grain to another, except what resistance the atmosphere produces.

There is one thing I forgot to mention, viz., that by using a very small charge of powder and by wetting the wad or patch very wet there will a few grains stick to the wad or patch unburnt, for the heat is not intense enough to dry it before it gets out of the gun, but with a large charge it will not only dry the wet powder but burn the patch as if a red hot iron had been pressed against the butt of the ball with a patch drawn over it.

M. L. ROOD.

Denver, Col.

THE strain of belts is always in the direction of their length; thus holes cut for the reception of lacings should be either oval, the long diameter in line with the belt, or placed in the line of a double or V-shaped angle across the width.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING DECEMBER 8, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

84,670.—PUNCHING MACHINE FOR TIN AND SHEET METAL.—John Annear, Philadelphia, Pa.

I claim the rotary bed plate, C, the punch, D d', and the "former," E e', the same being constructed and arranged to be operated together, in any suitable frame, A B, substantially as and for the purpose described.

84,671.—DEVICE FOR PREVENTING INCRUSTATION IN STEAM GENERATORS.—Robert Breckenridge Baker and Charles James Adolphus Dick, Paris, France, assignors to the American Anti-Incrustation Company.

We claim an insulated mass or block of carbonaceous matter, suspended within a boiler, near one end of the same but connected by a wire to the shell of the boiler, near the opposite end of the latter, all substantially as set forth.

84,672.—SHAFT COUPLING.—Charles Bennitt, Bristol Station, Ill.

I claim the combination of the band, H, journal, G, pulleys, E E, jaws, C and D, with the rods, B B, as and for the purpose herein specified and shown.

84,673.—MACHINE FOR CUTTING EYELETS.—George B. Brayton, Providence, R.I.

I claim an apparatus for cutting tubing into sections, for eyelet blanks or other purposes, consisting of a series of revolving cutters, a a, a surrounding revolving jacket, B, for holding and conveying the tubing, and a pressure cylinder, C, all in combination, substantially as described, for the purposes specified.

Also, making the openings, D, in the jacket or casing, B, for holding and conveying the tubing inclined to the axis of the series of cutters, a a, as herein set forth, for the purposes specified.

84,674.—SELF-REGULATING AIR VALVE FOR STEAM HEATERS.—Moses P. Breckenridge Meriden, Conn.

I claim inserting the frame, B, which holds the spring, C, into the case or cylinder, A, by this means allowing the said cylinder to be constructed in one piece, and thereby doing away entirely with the use of packing.

84,675.—GAS BURNER.—Julius Bronner, Frankfort-on-the-Maine, Prussia.

I claim, 1st, The use of a slit as aperture to a gas burner, the top exterior surface of the head of which is concave or funnel shaped, substantially as and for the purposes set forth.

2d, The combination of the two gas burners thus made, in other words, of two fish tail slit burners, to form a compound economic or double burner, or of one such fish tail slit burner, with an ordinary burner, substantially as described.

3d, The use of the fish tail slit burner head or insertion, c, constructed and applied substantially as hereinset forth.

84,676.—RUFFLING DEVICE FOR SEWING MACHINE.—Reuben Brooks, Jr., and William N. Manning, Rockport, Mass.

We claim, 1st, The combination of the bar, B, slotted plate, H, and screw, G, all constructed substantially as described, and for the purpose set forth.

2d, The rubber presser, D, combined with the bar, B, and tension plate, E, substantially as specified.

3d, The adjustable spring guide, F, in combination with the tension plate, E, and presser, D, as specified.

84,677.—FASTENER FOR LASTS.—Hiram Brown, Burton, O.

I claim the slide, D, so arranged in such relation to the last, B, that the lower end of said slide is received directly into the last, in the manner as and for the purpose set forth.

84,678.—MECHANICAL MOVEMENT.—A. R. Buffington, U.S.A.

I claim the improved mechanical movement, consisting of devices herein described, by means of which angular motion may be transmitted from one body to another, increased in velocity to twice, or reduced to one half, the power varying, but the motion uniform, according as the one from which the initial motion proceeds acts upon the other, by means of surfaces on which slide or roll parts connected with this other body, or through the intervention of projections, axles, hubs, or pins simply, or these with blocks or wheels fitted on them, sliding, rolling, or moving in contact with surfaces of said otherbody, as substantially herein described.

84,679.—GAS RETORT.—Mills L. Callender, New York, assignor to himself and Sidney L. Holdredge, Greenburg, N. Y.

I claim a double retort, made, arranged, and operated in the manner and for the purposes substantially as described.

84,680.—WEATHER STRIP.—E. Carpenter, Carbondale, Pa.

I claim, 1st, The arrangement of the weather strip, A, having the two projections, a a', with the slots, e e', in the plates, E E, attached to the jamb, or in the jamb itself, substantially as herein described and shown.

2d, The combination of the strip, A, levers, B D, and door, when the several parts are constructed and arranged to operate in the manner described and shown, and for the purposes specified.

84,681.—FRICTION CLUTCH PULLEY.—Andrew B. Clemons, Ansonia, Conn.

I claim, 1st, The screw-threaded levers, E and E', in combination with the friction plate, D, and threaded hub, C, of the pulley, for the purpose of drawing the two parts together, substantially in the manner and for the purpose specified.

2d, The slide, F, in combination with the levers, E and E', and pins, a a, for the purpose of operating the said levers upon the hub, C, of the pulley, substantially as herein set forth.

84,682.—WAGON TONGUE SUPPORT.—N. A. De Long, New Scotland, N. Y.

I claim the combination of the tongue and axle with the slotted adjustable plate spring, embracing the standard, F, and having four points of support, as and for the purpose set forth.

84,683.—LEVER GRAPNEL.—Edwin B. Dewey, Pontiac, Mich.

I claim the bearing lever, F, provided with suitable hook, G, when connected with curved and pointed levers, A and B, and constructed and operating substantially as and for the purposes herein set forth and described.

84,684.—HORSESHOE.—Fordice W. Edison, Port Huron, Mich.

I claim the arrangement of the expanding springs, C C, on the toe piece, B, to which the wings, A A, are pivoted, substantially as and for the purposes set forth.

84,685.—MAGAZINE GUN.—W. R. Evans, Thomaston, Me.

I claim the combination of the fluted shaft, D, which contains one or more flutes, with the fixed spiral thread or partition, B, substantially as specified.

84,686.—APPARATUS FOR DEODORIZING, DESICCATING, AND MIXING MANURES.—Henry S. Firman, New York city.

I claim, 1st, Arranging a close desiccating and mixing pan, constructed substantially in the manner described, and provided with mixers, as set forth, in a close heating chamber over a furnace or heating flue fitted with dampers, and constructed substantially as described.

2d, The combination of the supply hopper, constructed substantially as described, with a close desiccating pan for the purpose of introducing the material to be treated in the pan, as set forth.

3d, Combining, with a close desiccating and mixing pan, a deodorizing or absorbing chamber for the purpose of utilizing the offensive gases, and avoiding the nuisance occasioned by their escape from the pan.

4th, Creating a circulating of the air and gas in the desiccating pan by by means of an air pump affixed thereto, through the agency of pipes, arranged substantially as described.

84,687.—FASTENING FOR HORSE COLLARS.—James P. Force and John E. Force, Constantine, Mich. Antedated November 21, 1868.

We claim the combination with the collar A A' A'', of the flexible straps or latches, B, and catches, C, constructed and employed as and for the purpose described.

84,688.—CAR SPRING.—Perry G. Gardiner, New York city.

I claim the arrangement of an india-rubber spring, H, surrounded by steel spring rings, n m, and w, and india-rubber springs, J, enclosed in a suitable casing, E, in combination with a plunger, P, acting upon the central india-rubber spring, H, the whole being combined and operating together, in the manner and for the purpose substantially as described.

84,689.—GAS-LIGHTING DEVICE.—E. P. Gleason, New York city.

I claim, 1st, Charging or filling an elastic gas-tight receptacle with gas, and then supplying the same to a burner connected thereto for lighting purposes, whether the same shall be accomplished in the precise manner shown, or in an equivalent manner.

2d, The combination with an elastic gas-tight reservoir, B, of a suitable case, A, and an exit-pipe, D, constructed and operating substantially as described for the purposes specified.

3d, The combination of an elastic gas-tight reservoir or receptacle, B, case, A, and exit pipe, D, with a spring, G, placed either within or beneath the receptacle, B, for the purposes fully described.

4th, The combination of the case, A, receptacle, B, exit pipe, D, and spring, G, with the cord, E, for the purposes set forth.

84,690.—MACHINE FOR STRETCHING HAT BODIES.—William C. Griswold, Brooklyn, N. Y.

I claim the combination of the tip-stretching mechanism consisting of the spokes, c', and star, m, with the brim-stretching mechanism, consisting of inclined stationary arms, d', and the expansible or spreading arms, l, all constructed arranged, and operating substantially as herein specified.

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84,691.—MANURE HOOK.—Michael Stoll and Henry Gross, Middletown, Pa., assignors to Henry Gross

We claim,1st, The handles, A, provided with the slots, i i, and the stops, p p, in combination with the beam, B, and hook, C, substantially as described, and for the purposes set forth.

2d, The lever, e, to act in conjunction with the slot, j, as and for the purposes specified.

84,692.—IMPLEMENT FOR TRENCHING AROUND PLANTS TO PREVENT THE APPROACH OF WORMS.—W. H. Halleck, Ann Arbor, Mich.

I claim the invention of an implement to prevent the cut or wire worm from destroying corn and plants, using for that purpose the aforesaid stamp, (circular, rolling, square, sliding) or any shape substantially the same, for the same purpose as herein set forth

84,693. —GRAIN BINDER.—Virgil Hayes, Campbell G. Waldo, and Harlan A. Main, Tekonsha, Mich.

We claim, 1st, The stationary arm, J, and the tilting rack, K, with its disengaging lever, l, the bracket, M, and stationary rod, N, provided with rests, O, spool pulley, P, with its spool, Q, pin, X, and hollow arm, R, with its opening, S, or their equivalents, when arranged and operating substantially as and for the purposes specified.

2d, The clutch pulley, V, provided with inclined plane, 2, clutch lever, W, shifter, Y, clutch, 1, shaft, 3, the pulley, Z, provided with wrist pin, 7, and hook, 8, spur wheel, 4, pinion, 5, ratchet wheel, 6, hinged binding apron, U, spring latch, 10, closing spring, 12, provided with wire or rod, 11, and the knife, 9, or their equivalents, when arranged and operating substantially as and for the purposes set forth.

84,694.—CLOTHES RACK.—I. Hogeland, Indianapolis, Ind.

I claim, in a rectangular clothes frame, the two rigid stays or cross bars, B B, pivoted at one end to one of the side pieces, A A, and having the end which is not pivoted attached to the opposite side piece, in such a manner that it is easily detachable, substantially as described and for the purpose specified.

84,695.—SHEARING MACHINE.—Samuel W. Huntington, Augusta, Me.

I claim, 1st, The construction and arrangement of the fixed blade, a, the post, c, and goose neck, e, the lever, i, attached to and moving in the slot formed in said goose neck, and the movable shear blade, connected with both the post, c, and lever, i, as herein shown and set forth.

2d, In conjunction with the fixed and movable blades, a and f, and the lever, i, arranged as specified, the auxiliary cutting blades, d and g, formed in rear of the pivotal point, a', the one upon the post, c, and the other upon the prolongation of the shear, f, as herein shown and described.

84,696.—BURGLAR ALARM AND TABLE BELL. — Anthony Iske (a signor to himself and Benjamin Mishler), Lancaster, Pa.

I claim the combination and arrangement of the base, V, with its chambers for the affixed key, U, and the spiral spring, T, gearing, and bell attachment, all constructed and operating substantially in the manner and for the purpose specified.

84,697.—DEVICE FOR CUTTING OUT SECTIONS OF ANNULAR CYLINDERS.—Jacob O Joyce, Dayton, Ohio.

I claim the combination and arrangement of the bed plate, A, tool post, G, and cutter, I, with the gear wheel, C, shaft, E, worm, D, all substantially as and for the purpose specified.

84,698.—LATHE CHUCK.—Anson Judson, Brooklyn, N. Y.

I claim making the jaw, C, and the nut, B, or its equivalent, in two or more parts, instead of in a single piece, as has formerly been done, and so combining these parts that the action of the part, B, upon the part, C, shall draw the latter snugly to the face plate or bed, substantially as herein before set forth

84,699.—MODE OF APPLYING CRYSTAL FROSTING TO GLASS. —Handy B. Kimball, Charlotte, Mich.

I claim, as a new article of manufacture, the "crystal frosting" on window glass, producing by flowing one side with any suitable efflorescing solution and protecting the efflorescence, when fully dry, with copal or other suitable varnish, substantially in the manner and for the purpose herein specified.

84,700.— CAR COUPLING.—Christian Kohler, Galena, Ill.

I claim the combination of the lever, a, pivoted pin, h, with a buffer head, which has cavities, i and j, therein, when constructed and arranged to operate in connection with a spring, k, substantially as described as and for the purpose specified.

84,701.—BOLT TRIMMER.—G. W. Lewis, Dansville, N. Y.

I claim, 1st, The curved handle, d, cast with the stock, A, in combination with the independent screw, l, the cam lever, g d', fulcrum, i, and the cutters, b c, substantially as described for the purpose specified.

2d, In combination with the above, the spring, h, substantially as and for the purpose described.

84,702.—WATER PROOF PAINT.—John A. Moffitt, Boston, Mass. Antedated November 25, 1868.

I claim, 1st, The combination of either india-rubber, gutta percha or balatta, with benzine or naphtha, and either arsenic arsenic acid, or the "universal deodorizing powder", as dryers, in manner and for the purposes hereinbefore described.

2d, The combination of either india-rubber, gutta-percha, or balatta, with benzine or naphtha, and either of said dryers, arsenic, arsenic acid, or the "universal deodorizing powder," with oils and pigments, in the manner and for the purposes hereinbefore described.

3d, The application of arsenic, arsenic acid, or the "universal deodorizing powder," as dryers for india rubber, gutta percha, or balatta.

84,703.—CHILD'S DIAPER.—Mary A. Moore, Lisbon, Ill.— Antedated November 23, 1868

I claim the combination of the diaper, A, with the elastic straps, B C D, constructed and arranged substantially as set forth.

84,704.—REVERSIBLE LATCH.—W. T. Munger, Brandford, assignor to P. and F. Corbin, New Britain, Conn.

I claim the lever, a, acting as a stop, and also retaining the reversible latch, substantially as specified.

84,705.—GRAIN SEPARATOR.—S. E. Oviatt, Richfield, Ohio

I claim, 1st, The finger bar, D, and conveyer, C, in combination with the roller, H, or its equivalent, to operate substantially as set forth, for the purpose specified.

2d, So hanging the finger bar, D of the conveyer to the endless belt, chain, or apron, as to allow the said finger bar to receive a turning or tipping motion, to throw or agitate the straw when it is being conveyed from the threshing cylinder, substantially as and for the purpose described.

84,706.—THRESHING MACHINE. — S. E. Oviatt, Richfield, Ohio.

I claim, 1st, The metallic bracket, C, when attached to and forming a support for the lower end of the stacker, B, and having its pivot or journal a hollow, forming a box or bearing for the carrier shaft, E.

2d, The metallic bracket, C, so connected with the stacker, B, and frame of the thresher as to form a pivot and support for the lower end of the stacker, substantially as set forth.

3d, The hinged tail board, H, and tail screen, I, in combination with the shoe, G, of the thresher, substantially as and for the purpose set forth.

4th, the hinged chute, K, cut off, L, and shoe, G, arranged in the manner and for the purpose as set forth.

84,707.—ADVERTISING DEVICE.—Cyrus Peabody and Patrick H. Delaney, Detroit, Mich.

We claim the combination, with an advertising board or frame, of a bell-striking clock-work, substantially as and for the purposes set forth.

84,708.—HORSE HAY FORK.—Cullen W. Reed, Chagrin Falls, Ohio.

I claim the cross head, A, when the same is slotted its entire length, the pivoted hinged tines, B and C, when the former is provided with a lever arm, B', in combination with a dog, E, and the whole is so arranged as to operate substantially as and for the purposes set forth.

84,709.—REPEATING CLOCK.—C. W. Roberts, Austin, Ill.— Antedated November 21, 1868.

I claim, 1st, The combination of the bell spring, J, bell, I, and standards, a b c, etc, substantially as set forth.

2d, The combination of the bell, I, spring, J, slide, G, cams, M N, and levers, D B, as and for the purpose set forth.

84,710.—STEAM GRADUATOR. — William Aspley Robinson, Auburn, N. Y.

I claim the arrangement of the graduating lever, B, with the reversing lever, A, quadrant, C, and joint, E, as shown and described.

84,711.—GATE LATCH.—John C. Rogers, Alden, N. Y.

I claim the oscillating catch, C, hinged to the getepost, and provided with notch, e, and socket, f, in combination with the rigid pin, g, and bolt, i, operating substantially in the manner and for the purpose set forth.

84,712.—HAY FORK.—E. G. Dorchester and Uri Scott, Geneva, N. Y.

We claim the tines, A, when constructed as herein shown and described, and wedge, B, and screw, c, or its equivalent, in combination with the ferrule, C, all acting conjointly, as and for the purpose set forth.

84,713.—MACHINE FOR SACKING POTATOES.—Edwin Seely, Elkhart, Ind.—Antedated November 23, 1868.

I claim the hetchel slides, C and D, bin, B, the whole constructed, arranged, and operated substantially as and for the purpose set forth.

84,714.—MACHINE FOR BENDING SHEET METAL. — Amos Shepard, New Britain, Conn.

I claim, 1st, The combination of the plate, C, bars, A A, and supports, L L, the whole connected and operating substantially as and for the purpose described.

2d, The combination of the plate, C, bars, A A, slides, B B, and set screws, c c, the whole connected and operating substantially as and for the purpose described.

3d, the combination of the plate, C, bars, A A, gauge, a, and table, K, arranged and operating substantially as and for the purpose described.

4th, Hinging the plate, C at one end so that the other end of the plate, C can be raised, substantially as and for the purpose described.

5th, The combination of the bars, A A and plate C, when arranged so that at each operation of the machine the plate, C, shall move edgewise towards the bars, A A, and gripe the metal previous to any action or movement of the bars, A A, substantially as and for the purpose described.

84,715.—WASH BOILER.—M. W. Staples, Catskill, N. Y., assignor to himself and John H Burtis, New York city

I claim the tubular legs, d, supporting the removable bottom, c, and provided with openings in their sides, near the lower ends, in combination with a tube, rising above the bottom, c, through which the rising water circulates, substantially as set forth.

84,716.—CAR COUPLING.—O. S. St. John, Willoughby, Ohio.

I claim, 1st The link, G, made with hook, b, and guide shoulders, C, thereon, operating in the manner and for the purpose described.

2d, In combination with the above, the cams, K and L, chain, N, and shaft, I, arranged as described, and operated by the means, and in the manner, and for the purpose substantially as specified.

84,717.—TACK HOLDER AND CARPET STRETCHER.—J. E. Sturdy, Augusta, Me.

I claim, as a new article of manufacture, a combined carpet stretcher and tack holder, composed of two hinged jaws, notched upon either or both of their contiguous edges, so as to receive and hold the tack, and having their carpet stretching teeth turned inwardly or towards the center, as set forth, either without or in combination with a spring of vulcanized rubber, or its equivalent, for holding said jaws together, substantially as and for the purposes described.

84,718.—BEEF STEAK CUTTER AND MANGLER.—De Witt C. Thompson, Ischua, N. Y.

I claim the combination of the forks, A, with the platform, D, and rollers, B, and sharp knives, C, as above described, for the purpose specified.

84,719.—HYDRAULIC APPARATUS.—John Findley Thompson. Greensborough, Pa.

I claim, 1st, A pair of upright stationary cylinders, having ports for the admission of water from the forebay, in combination with the valves, a a', which open and close such ports, and pistons, e e', which operate inside the cylinders, and are attached to the opposite arms of a walking beam, substantially as and for the purposes above set forth.

2d, A reciprocating shaft, l, when used for actuating the valves of water-proof cylinders, b b', and constructed with adjustable connections, h and l', for securing an adjustable or variable cut-off, and giving any desirable lift to the valves, substantially as above set forth.

3d, Imparting to the reciprocating shaft, l, a greater or less length of throw, by raising or lowering in a slot, o', the forward or operating end of an eccentric rod, F", the devices being constructed and operated substantially in the manner and for the purposes hereinbefore set forth.

4th, The slotted levers, m m', when connected by supports, u u', with the valve lifters, n n', in such way that the open port of one cylinder may be closed before the completion of the downward stroke of its piston, without opening the ports of the other cylinder till the upward stroke of its piston shall be nearly or quite complete, substantially as and for the purposes hereinbefore expressed.

5th, The slotted arm, x, on the walking beam, C, of a water power, and the slotted circular head, y, or its equivalent, connected together by a pitman, x, adjustable at each end, the parts being arranged and operating substantially as and for the purposes hereinbefore set forth.

6th, The upright cylinders, b b', with valves, ports, and pistons, as a fluid meter, constructed and operated substantially as and for the purposes hereinbefore set forth.

84,720.—METAL LAST.—G. G. Townsend, Rochester, N. Y.

I claim the revolving metallic last, B, when made as shown, so as to withstand a blow from the hammer on any portion or point of the face or sole, in combination with the conical pointed standard, A, for the purposes set forth.

84,721.—MACHINE FOR GRINDING CIRULAR SAWS.—Stephen D. Tucker, New York city.

I claim, 1st, Making the head adjustable on the carriage, K, in combination with the rollers, E' F', for driving the saw, whereby the machine can be readily adjusted to grind saws of any diameter, substantially as described and specified.

2d, The movable rest, h, for holding the saw at the point of grinding, whereby the saw may be automatically ground of a concave, convex, or plane surface, substantially as described and specified.

3d, The rest, h, screw, l, provided with its arm, M', and the grooved and slotted guide, L', pivoted to the carriage, substantially as described and for the purpose specified.

4th, The combination and arrangement of the clutch, p, pulleys, C' C', the worm, V', on the shaft, W', upright shaft, N', with its spring, y, and the adjustable stops, d d, on the carriage, for operating the carriage in both directions automatically, substantially as described and specified.

5th, The rod, N', provided with the arm, v, and pin, w, clutch, p', and adjustable stops, d d, on the carriage, for reversing the travel of the carriage substantially as described and specified.

6th, The scroll gear, G', and inclined rack, I', on the carriage, for giving a differential movement to the carriage, substantially as described and specified.

7th, The arbor or bearing, q, center pin, p, and cap, o, substantially as described and specified.

84,722.—SAW.—John L. Warren, Detroit, Mich.

I claim the construction of a saw, substantially as described, with two cutting edges, the one operating at any desired angle relative to the other.

84,723.—HOMINY AND SMUT MILL.—Warren Wright, St. Louis, Mo.

I claim, 1st, The "double case," consisting of the divided end plates, A B A' B', the divided cylindrical shell, C D, and the divided perforated scouring cylinder, E F, within and concentric with said shell, C D, all said parts being arranged to operate substantially as herein described, for the purposes set forth.

2d, In combination with the partitions, H, the wedge formed wings or cut-offs, S, arranged upon a rotating shaft, in the manner set forth.

3d, The longitudinally adjustable scouring and blowing shaft, O, constructed with the air gathering cup or scoop, P, and air discharges, o, and armed with roughened blades, R, wedge formed wings or cut offs, S, and spiral discharge blades, S', in combination with a horizontal partitioned and perforated cylinder, substantially as herein described, for the purposes specified.

4th, The combined arrangement with the descending grain discharge spout T, of the laterally traversing and upturned blast passage, U u u', substantially as described, for the purpose specified.

84,724.—BRICK MACHINE.—Jacob H. Ballard and Edward P. Bond, New Antioch, Ohio.

We claim the frame, A, shaft, B, with wheel, b, pug mill, C, with opening, c2, and shaft, C', having the wheel, c1, plungers, D, shaft, d', wheel, E, chambers, F, with openings, and wires, the whole being combined, arranged, and operated in the manner described and for the purposes set forth.

84,725.—HAY SPREADER.—A. B. Barnard, Worcester, Mass., assignor to Thos. C. Craven, Albany, N. Y.

I claim the combination with the screw standard of standards, F, provided with nuts as shown, of coiled spring or springs, K, substantially as and for the purposes set forth.

84,726.—COMBINED BAND CUTTER AND FEEDER FOR THRESHING MACHINES.—P. G. Biggs, H. A. Butler, and H. Granger, Macon, Mo.

We claim the spreader, H I, constructed as described, in combination with the band cutter, E G, carrier, C D, and frame or box, A, substantially as herein shown and described and for the purpose set forth.

84,727.—BRICK MACHINE.—Eli S. Bitner, Lock Haven, Pa.

I claim 1st, The pressure rollers, D D1, in the movable frame, A5, chain of molds, C, plank, H, and corrugated feed roller, E, constructed and arranged substantially as and for the purposes herein set forth.

2d, The mold, C, when provided with the movable side, c, and crank pin c1, operated by contact with the inclined planes, I, and pressure roller, D substantially as and for the purposes herein described.

3d, The combination of the feed screw, F, when deflected at f, with the disk, f1, and feed box, F1, all constructed and operating substantially as and for the purposes set forth.

84,728.—PROCESS AND COMPOSITION FOR PRINTING THE GRAIN OF WOOD.—Johann Bongardt (assignor to himself and L. H. Cohn, New York city.

I claim, 1st, The method herein described of preparing wood to cause it to print its veneer or grain on paper or other material, as set forth.

2d, The combination herein described for treating wood, for the purpose set forth.

84,729.—GATE.—Edward Buckman and Alexander Buckman, Greenbush, N. Y.

We claim the combination and arrangement of the latches with the supporting posts and the stops upon the gate, substantially as and for the purpose specified.

84,730.—HARVESTER RAKE.—Orrin H. Burdick (assignor to himself and David M. Osborne), Auburn, N. Y.

I claim, 1st, The adjustable cam way, h, in combination with the permanent cam way, g, for the purpose of raising the rake over the grain that may be on the platform, when it is desired to use the rake as a beater only, substantially as described.

2d, Also, the combination of the two adjustable cam ways, G h, for controlling the action of the rake, substantially as herein described.

3d, Also, in combination with the fixed or permanent cam ways for guiding and controlling a series of rake and beater arms in their rotation, the lever, F, and movable cam ways, dog, and trigger, for allowing the driver from his seat to control rake, and throw it out of raking action, while the rake itself sets the parts for allowing it to go into raking action, substantially as described.

4th, Also, in combination with the rake and beater heads, the auxiliary arms, P, and the three adjustable fastenings, u v and v', for giving such heads and arms the requisite inclinations upon their arms, B, substantially as described.

84,731.—POULTICE CLOTH.—Maximilian L. J. Chollet and Celeste H. E. Hamilton, Paris, France.

We claim an article of manufacture consisting of a poultice composed of leaves of canvas or muslin, impregnated with mucilaginous substances, substantially as herein described.

84,732.—WASH BOILER.—L. T. Conant, New Lisbon, Ohio. [Suspended.]

84,733.—PRESERVING WOOD.—Eben L. Cowling, Boston, Mass., assignor to Jas. P. Bridge.

I claim the employment of dry superheated steam, in combination with vaporized chemicals, for the preservation of wood, as set forth, the natural moisture of the wood being first absorbed by the use of the dry superheated steam without the chemicals, and the air expelled, substantially as described.

84,734.—TANNING COMPOSITION.—Needham Cox (assignor to himself, Christopher M. Houss, and J. S. Moore), Salem, Ill.

I claim the use of all of said ingredients, when applied in the proportions heretofore given, or their equivalents, substantially as and for the purposes set forth.

84,735.—RAILROAD CAR HEATER.—Arnold Davidsohn, St. Louis, Mo.

I claim the car heating device composed of box, D, slide, d', influent hopper, E, valve, e, and effluent hopper, F, and discharge valve, f, when constructed to operate as described, and arranged with relation to the vehicle substantially as set forth.

74,736.—STOVEPIPE JOINT.—John Faint, Columbus, Canada.

I claim a section of stovepipe seamed longitudinally, except that portion lapping the adjoining section, such portion being lapped the width of the seam, or thereabout, as shown and described, for the purpose set forth.

84,737.—DOOR LOCK.—Charles Fleischel and Wm. C. Bussey, San Francisco, Cal.

We claim the plate, K, fastened upon the bolt of the lock, and provided with the wards, c c, etc., in combination with the cylinder, B, disk, C, and revolving tumblers, F F, substantially as described, and for the purposes set forth.

84,738.—PAPER FILE.—J. M. D. France, Washington, D. C.

I claim a device for filing papers, consisting of a frame, A A, notched as described, in combination with bar, B, base, C, sliding board, D, and pin, E, combined and operated in the manner substantially as hereinbefore described for the purpose specified.

84,739.—CONDUCTORS' PUNCH.—John Friese and G. D. Friese, (assignors to John Friese), Baltimore, Md.

We claim, in connection with the eyelet-cutting instrument having the two jaws, A and B, the tooth, a, the opening, e, and the spring, C, the rigid plate, M, when attached to the jaw, B, upon a raised bed, s, and provided with the opening to receive the tooth, a, and bent so as to hook over the end of jaw, A, the several parts being constructed to operate together in the manner and for the purposes herein set forth.

84,740.—MODE OF CONSTRUCTING THE HEATING AND LIGHTING Apparatus on Railway Cars.—Abram J. Gibson, assignor to himself, Benjamin J. Thurston, and Thomas A. Harrow, all of Cincinnati, Ohio.

I claim, 1st, A perforated metallic partition, inclosing and constituting a fire-proof lighting and heating chamber, in one end of a railway car, constructed in the manner and for the purpose substantially as herein set forth.

2d, One or more lenses, in the perforated metallic partition of a fire-proof lighting and heating chamber of a railway car, as and for the purpose above specified.

3d, The safety sash or window, when so constructed as to constitute the outer side of a lighting and heating chamber in a railway car, as hereinbefore described and set forth.

84,741.—POTATO DIGGER.—J. E. Giles and W. Ferry, Mead's Mills, Mich.

We claim arranging the shares, S S, on the landsides in such a position that the landsides will gather the vines together before the shares enter the hill, substantially as shown and described and for the purpose set forth.

Also, the construction and arrangement of the two shares, S S, as shown and described, viz, by making their front edges recede to the rear, and leaving an opening there between them, when said shares are combined with the landsides, substantially as and for the purpose set forth.

Also, the arrangement of the tines, N N, etc., in a double curve, as shown and described and for the purpose set forth.

Also, the combination of the brace, E, (applied to prevent the spreading of the landsides), with the bow, D, when said bow is arranged in position to prevent its engaging with the vines, substantially as and for the purpose set forth.

Also, the brace, A, when arranged as shown and described for the purpose set forth.

84,742.—SHIPS' DAVITS.—Seth Gill, San Pablo, and D. C. Woods, San Francisco, Cal.

We claim, 1st. The jointed davit arms, E E, with their tackle or an equivalent device, the whole constructed and operated substantially as and for the purpose herein described.

2d, In combination with the jointed arms, E, the traveler, L, with its in-haul and out-haul tackles, M and N, substantially as described.

3d, In combination with the davit arms, E, the uprights, D, with the lifts, H, and sranchion, I, the whole connected by rods with the davits on the opposite side, substantially as and for the purpose herein described.

84,743.—BOOT CRIMPER.—William B. Gleason, Conneautville, Pa.

I claim 1st, the grab bars, S S, spring block, M M, the movable spring grabs O O O O, all constructed substantially as set forth.

2d, The crimping board, L, combined with the grab bars, S S, spring block, M, and movable spring grabs, O O O O, for the purposes as set forth.

84,744.—ELEVATOR.—J. E. Hollister, Calais. Vt.

I claim, 1st, Combining the brake, A, and the pulley, G, with the car, as and for the purpose specified.

2d, The hoisting rope, c, and tackle block, J, in combination with the brake A, and pulley, G, for the purpose and substantially as described.

3d, The tripping rope, I, applied to the hook end, N, of the brake, as and for the purpose specified.

4th, The draw rope, H, in combination with the car, E, and eye, k, as and for the purpose specified.

5th, The adjustable and movable cam, h, constructed as described, and applied to the rail, C, for the purpose and substantially as described.

6th, The rod, f, in combination with the brake, A, and the cam, h, for the purpose and substantially as described.

7th, The plate, e, or holding device, in combination with the hook end of the brake, A, for the purpose and substantially as described.

8th, The combination of all the operative parts specified, when arranged to operate substantially as and for the purposes set forth.

84,745.—HORSESHOE.—R. G. Jameson and W. H. Chamberlain, Bristol, N. H.

We claim the bar, C, of the form herein shown, and provided with heel and toe calks, when fastened to the shoe by means of the hooks, f f, and slots, b b, at the heel, and screw, i, at the toe, substantially as described for the purpose specified.

84,746.—PREPARATION OF STEEL FOR CORSETS, HOOP SKIRTS, etc.—Catharine Maxwell and I. N. Peirce, Philadelphia, Pa.

We claim coating steel with this composition, for use in female apparel, as herein described, or any other substantially the same, and which will produce the intended effects.

84,747.—CAR COUPLING.—C. McInturff, Greenville, Tenn.

I claim a car coupler, composed of the bars, A, with hooks, B, and springs, H, and sliding blocks, C, with springs, D, when used in connection with the levers, G, all constructed and arranged substantially as described and for the purposes specified.

84,748 —GANG PLOW.—F. McTarnahan, Santa Clara, Cal.

I claim, 1st. The frame or groundwork of the gang plow.

2d, The combination and arrangement of the beam, R, to which the plows are fastened, the beam to which said plow beam is fastened by hinges, the semicircular hinges, as constructed, and the manner of fastening the plows in the beam, all as shown.

3d, The screw slides, A, in combination with the frame,

4th, The combination and arrangement of the beam, L, to which the lever is fastened, the post on which it works, the chain, the pulley on which it works, the evener, and the guard all as described.

5th, The square block, D, under the axletree, for regulating the amount of land, in combination with the evener.

6th, The construction, combination, and arrangement of the several parts, as shown and described.

84,749.—COAL CHUTE.—Henry Merriman, Bloomington, Ill.

I claim the inner weighted apron, C, having the loose catch rods, g, and described, whereby, as the outer apron is swung down to form a spout, the pivoted at its lower edge to the chute and the outer weighted apron, D, also pivoted at its lower edge and provided with the lugs, o o, all operating as lugs, o o, release the rods, g, from the catches, e, and permit the inner apron to open the chute for the discharge of coal, substantially as herein shown and described.

84,750.—PLOW ATTACHMENT (DOUBLETREE).—L. E. Morey, Vandalia, Ill.

I claim a plow attachment, having four connecting points, a b b and b', arranged substantially as herein described for the purpose set forth.

84,751.—SEED PLANTER.—James Musgrave, New Cumberland, West Virginia.

I claim, 1st, Detachably securing the buckets, H, to the belts, F, by means of the brackets, G, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the tube, J with the hopper, I, and buckets, H, substantially as herein shown and described and for the purpose set forth.

84,752.—LAMP BURNER.—George Neilson, Boston, Mass.

I claim, 1st, The combination, with the cone and cone-supporting cylinder, of the chimney rest, chimney, and spring device, by which the latter is supported and steadied, under the arrangement and for operation as herein shown and specified.

2d, The combination, with the chimney and chimney rest, of the springs and hoop or ring for holding the upper ends of said springs, in the manner and for the purposes herein shown and described.

84,753.—LAPPET OR EMBROIDERING LOOM.—Frederick W. Newtown, South Orange, N. J.

I claim, 1st, the combination of the pattern mechanism with the stitch-mechanism, when the two are actuated by different powers, or are connected with the same power by intermediate gearing or attachment, so as to give to each mechanicism a motion distinct from the other, substantially as described.

2d, The friction rollers or cylinders, one or more, for the purpose of giving a definite yet adjustable quantity of whip yarn to the needles without tension, substantially as described.

3d, The roller, J, of irregular or cam-shape, in combination with the pin and needle-bars, for the purpose of giving them an irregular motion, substantially as described.

4th, The combined ratchet and pinion-wheel, G, in combination with the rack, H, substantially as and for the purpose described.

5th, The double wedge bar, I, for the purpose of regulating the quantity of whip yarn to be furnished to the needles, substantially as described.

6th, The lever, n, in combination with the bar, O, and its pin for raising the double-wedge bar, substantially as described.

7th, The traverse bar, M, in combination with the needle bar and friction rollers, substantially as described.

8th, The combination pinion and friction wheel, N, in combination with the friction wire, substantially as described and for the purpose set forth.

9th, The lever, e, with adjustable fulcrum, in combination with the traverse bar, M, and needle bar for regulating its movements, substantially as described.

10th, The friction sleeve having an upright stand, in combination with the pattern and stitch wheels, and traverse lever, e, substantially as described.

11th, The combination with the stitching mechanism, of the adjustable pawl, Q, constructed and operating substantially as described.

12th, The combination of the mechanism which makes the stitch with the mechanism which gives the whip yarn to the needles, arranged and connected substantially as described, so that the motion of the mechanism which gives off the whip yarn to the needles may be regulated and controlled by the stitching mechanism.

84,754.—PUMP.—Alozo Palmer, Hudson Mich., assignor to himself and N. H. Melcher.

I claim the disks, J' K and J' K', in combination with the rings, G G', bolt, H, rod, I, and plates, E E, with their valves, arranged and used as and for the purposes set forth.

84,755.—SEAT FOR RAILWAY CARS.—G. W. Perry and J. D. Billings, Wilmington, Del.

We claim, 1st, A seat, B, capable of longitudinal adjustment between side frames, A A', in combination with a reversible back, which is connected by arms, H, to the side frames, turns on an adjustable fulcrum on said arms, and which may be jointed to either edge of the seat, all substantially as and for the purpose described.

2d, The back, J, with its slots, z, and pins, s, sliding in the said slots in combination with arm, H, jointed to the side frames and to the pins, substantially as and for the purpose specified.

3d, The bent rods, E, pins, m at the ends, and sliding and turning at the sides of the seat, B, in combination with a reversible back, J, having openings, t, for the reception of the pins, m, substantially as described.

4th, The rods, E, with the pins, m, and arms, n, in combination with the box, B', the slotted plates, h, and the traversing plate, F, connected to the arms, n n, the whole being arranged and operating substantially as set forth.

5th, The sliding seat, B, with its ratchets, o o, in combination with the shaft, G, pinions, k and q, and a worm, for operating the said shaft, substantially as set forth.

6th, The frame, K, which is hung between the side frames, A A', and to which are hinged arms, u u, connected by cross strips, w w, substantially as and for the purpose described.

87,756.—DOOR RETAINER.—G. W. Perry and J. D. Billings, Wilmington, Del.

We claim a plate, a, having an opening for the reception of a block, E

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which rests upon springs, d, below the plate, the whole being constructed and operating substantially as and for the purpose described.

84,757.—WAGON BOX.—H. W. Persing, Centralia, Ill.

I claim the combination and arrangement of the eccentrics, e e, the staples, f f, and the swivel, d, attached to the rods, c c, substantially in the manner described, and for the purposes set forth.

84,758.—GRIDIRON.—Edward B. Phelps, New York city.

I claim, 1st, The combined frames, F and F', with the central axle, E, in connection with the trough, K, and stop, N, operated and vibrated in the manner and for the purpose substantially as herein shown.

2d, Providing reversible grmirons with a trough, K, to operate and to be used for the purpose herein described.

84,759.—WASH BOILER.—D. A. Porterfield, New Paris, Ohio.

I claim, in combination with the boiler, the conical or pyramidal spouts, as described, i. e, their oases resting in the bottom of the boiler, without the intervention of a horizontal partition, and so arranged as to admit the supply of water by spanning the sunken pit, or by means of an opening at the bottom, as set forth.

84,760.—HORSE RAKE.—Adam R. Reese, Pillipsburg, N. J.

I claim 1st, The teeth, N, provided with the return arm, arranged relatively to and operating in connection with the rake head, substantially as described.

2d, The shafts, E E, when provided with the gains or notches, as set forth.

3d. The standard, I. in combination with the transverse bars, H H, arranged upon opposite sides of the shafts, E E, said bars being provided with gains, and operating as set forth.

4th, The bars, H H, when provided with the gains as set forth.

5th, The combination of the notched shafts, E E, plates, G G, axle, B, and bolts, F F, substantially as set forth.

6th, The combination of the notched bars, H H, shafts, E E, and bolts, K K, all arranged and operating as set forth.

7th, The removable cleaners, adapted to be secured to the axle by means of screws or pins, and removable for transportation, as set forth.

8th, The spurs on the cleaner rods, for the purpose, and substantially as set forth.

84,761.—STEAM ENGINE VALVE GEAR.—Hugh Reid, St. Louis, Mo.

I claim, 1st, The arrangement of the balanced piston valves, D1 D2, with reference to the exhaust cylinder, C, steam port, a, and exhaust ports, E and F, substantially as set forth.

2d, The arrangement of the piston valves, D1 D2, with reference to the rod, toggles, G G', pin, g, slot, h, and rod H, substantially as described.

84,762.—SEED PLANTER.—Isaac Rexford, Malone, N. Y.

I claim, 1st, The combination of the side bars, D, bars or supports, G, seed box, H, dropping cylinder, E, and wheels, F, with each other and with the forward axle, B, said parts being constructed and operating substantially as herein shown and described, and for the purposes set forth,

2d, The coverers, J, constructed as described, and draft bars or chains, K, in combination with the seed box, H, substantially as and for the purpose specified.

3d, The combination of the levers, L, cross bar, M, standard, N, lever, O, and standard, P, with each other, with the cross bar of the thills, A, forward axle, B, drooping cylinder, E, and seed box, H, substantially as herein shown and described, and for the purpose set forth.

84,763.—CORN PLOW.—W. C. Rhinehart and Robert Gaston, Oskaloosa, Iowa.

We claim the inclined fenders, b b, for protecting the reins of the driver from the action of the wheels, in combination with the inclined frame, B, substantially as set forth.

84,764.—REVERSE MOTION FOR WINDING ON BOBBINS.—George Richardson, Lowell, Mass.

I claim the cam, B, yoke, C, reverse rod, E, springs, I I', detent, G, and reverse catch, M, all combined, substantially as and for the purpose set forth.

84,765.—LUBRICATOR FOR JOURNALS.—C. M. Ried, Greensborough, Ala.

I claim the screw, c, with its flange, C, frame, E, cog-wheel, D, cranks, G, pitmen g, spring arms, H, dipper, I, in combination with the "housing" or "grease-box," when constructed and operating substantially in the manner and for the purroses set forth.

84,766.—COMBINED HORSE POWER AND TRUCK.—Cyrus Roberts and John A. Throp, Three Rivers, Mich.

We claim, 1st, The bevelled wheel, G, extended downward to the point, and in the manner represented for the purposes specified.

2d, A horse power, having cogged wheels, A, D, E, and G, staples, B, disk, C, friction rollers, c, and shaft, H, in combination with a truck, constructed and operating as herein specified, substantially as described.

3d, A truck, having V-shaped bottom, as described, bolsters, O, P, and Q, and rear V-shaped frame, as described, in combination with the horse-power herein described and shown, substantially as specified.

84,767.—DOOR FASTENER.—William J. Ross, Worcester, Mass.

I claim the slotted bar, A, in combination with the catch, B, and hooked sliding bar, D, provided with the thumb or set screw b2, all constructed, arranged, and operated substantially as and for the purpose set forth.

84,768.—GAS BURNER.—Edwin P. Russell, Manlius, N. Y.

I claim, 1st, The hollow cylindrical gas cock, B, constructed substantially as described, and operating as and for the purposes set forth.

2d, The combination of pipes, h and h', pipe or hole, z, and small cock, g, chamber, p, all as constructed with the gas cock, B, substantially as described, and for the purpose set forth.

3d, The sway bar, C, in combination with rods, W W', arms, f f', for operating the cock, B, constructed substantially as described, and for the purposes set forth.

84,769.—TRUSS.—Woodbury Sanborn, Chelsea, assignor to himself and Bailey West, Chicopee, Mass.

I claim, 1st, The shell, A, having a frame or spider attached to the inner side thereof, and provided with knobs attached to said spider, either with or without the cover, C, the whole constituting a truss pad, and constructed of the material and substantially in the manner set forth.

2d, The combination of the shell, A, the metallic frame or spider rigidly attached to said shell, and the T-shaped piece, F, pivoted to said spider, and mounted with knobs or buttons, the whole constructed substantially as specified.

3d, The construction and arrangement, in combination with a truss pad, substantially of the kind herein described, of the flexible body strap, D, and thigh strap, E, applied to said pad, substantially as set forth and shown.

84,770.—SALVE FOR BURNS AND SCALDS.—Andrew Schmitt, California, Mo.

I claim the formation of a salve for the cure of burns, etc., in the manner and of the materials herein described.

84,771.—HINGE.—William Shannon, Allegheny City, assignor to himself and Joseph Graff, Pittsburg, Pa.

I claim providing a hinge with a pintle, consisting of parts, C and D, the inner ends of which are upset, in the manner herein described and for the purpose set forth.

84,772.—HINGE.—William Shannon, Allegheny City, assignor to himself and Joseph Graff Pittsburg, Pa.

I claim, providing hinges with a pintle, C and D, made in two parts, the inner ends of which are beveled off at f, and provided with hooks, i, substantially as herein described and for the purpose set forth.

84,773.—STEAM ENGINE CONDENSER.—Joseph Shirt, and Charles Briggs, Tamworth, Great Britain.

We claim a condenser, constructed and operating as herein described.

84,774.—BEE-HIVE.—John Shoe, Pleasant Hill, Ohio.

I claim, 1st, The adjusting hinged inclined bottom, C, operating substantially as set forth.

2d, The top, B, provided with supports or strips, h h, to which are attached hooks, catching into staples on the hive, for the purpose of removing the said top, substantially as described.

84,775.—LAMP BURNER.—A. G. Smith, Jersey City, N.J. Antedated November 27, 1868.

I claim, 1st, In combination with the burner, A, and the cylinder, C, the ribs or projections, H H, substantially as and for the purpose set forth.

2d, The insulating ring, C, constructed with the flange, I, substantially as and for the purpose set forth.

3d, In combination with the burner, A, and elastic ring, C, the detachable plate, E, or its equivalent, for the purpose of rendering the ring, C, easily removable.

4th, The plate, E, secured to the wick tube, F, by a detachable device, substantially as set forth.

5th, Keeping the plate, E, always in contact with its detachable fastenings, by means of the elasticity of the material of the ring, C, as set forth.

84,776.—CULTIVATOR.—Garland B. St. John, Brooklyn, Mich.

I claim the securing of the standard, G, between the two beams, C C, by means of the bolt, m, arms, n n, and braces, H H, all arranged substantially as and for the purpose set forth.

84,777.—HORSE RAKE.—George E. Sutphen, Louisiana, Mo.

I claim the connecting rod, D, with seat, d2, when used in connection with spring, d1, upon rod, d3, as shown and described, and combined with the prop, C, having the foot piece, c, and lever, D', the whole being operated, in connection with the handle, B, and rake, A, as and for the purposes described.

84,778.—AUTOMATIC STOP FOR MINING CARS.—James Tambiyn, Virginia City, Nevada.

I claim the projections or stops, E E, arranged with the levers, C F, and spring, H, connected with the chain, G, and all applied to operate in the manner substantially as and for the purpose herein set forth.

84,779.—PILE FOR RAILROAD RAILS.—Thomas R. Taylor, Brodhead, Wis.

I claim the improved pile for forming railroad rails, when constructed and arranged as herein described.

Also, as a new article of manufacture, railroad rails, when produced from the improved pile herein described, as and for the purpose set forth.

84,780.—TIMBER GRAPPLE.—Moses N. Ward (assignor to himself, Benjamin S. Grant, and Thomas Hersey), Bangor, Me.

I claim the combination and arrangement of the double eyed and shouldered plate, B, made substantially as described, with the two pronged arms, A A, pivoted to such plate, as set forth.

84,781.—NUT MACHINE.—Francis Watkins, Birmingham, England. Antedated Nov. 28, 1868.

I claim the combination, with each other, of the reciprocating frames, D and E, stationary die, I, punches, F J and K, slide, G, punch, H, and stop, L, all made, arranged, and operating substantially as and for the purpose herein shown and described.

84,782.—BOLT MAKING MACHINE.—Francis Watkins, Birmingham, England. Patented in England, December 28, 1866.

I claim the arrangement, herein shown and described, of two bolt heading machines, constructed substantially as described, and so as to operate alternately, as set forth.

84,783.—GUIDING ATTACHMENT FOR SEWING MACHINES.—James Wensley, New Brunswick, N. J.

I claim, 1st, The pivoted gage, E, and pivoted transparent presser, G, in combination with the attachment, B, arranged and operating as described, for the purposes specified.

2d, The arrangement of the spring, I, and the notched bent arm, K, by which the presser plate is jointed to its support, whereby the spring is adjusted to the several notches in the bent arm, for regulating the pressure of the plate, as herein shown and described.

3d, The gage, E, provided with the stud, a, and adjustable part, b, substantially as and for the purpose described.

4th, The transparent presser, constructed as described, and hinged to the support by the rod, K, arranged, with reference to the guide, as herein described, for the purpose specified.

84,784.—CHURN.—Amos Westcott, Syracuse, N. Y.

I claim, 1st, The combination and arrangement of the segment hoop, c, socket, h h, with its projecting arms, k k, and the vessel for the reception of the material to be operated upon, substantially as shown and described.

2d, The combination of the segment hoop, c, and segment, b', substantially as shown and described.

84,785.—REFRIGERATOR.—Simeon Wheat, Middletown, and David B. Wheat, New York city, assignors to Frances M. Wheat and Ellen A. Wheat, Middletown, N. Y.

We claim an improved refrigerator, formed by the combination of the double-walled case or body, A, detachable ice-box, B, waste pipe, C, cup, D, drip pan, E, hinge shelf, F, middle shelf, G, having its middle part cut away, and plaster-of-Paris lining, K, with each other, substantially as herein shown and described, and for the purpose set forth.

84,786.—TRACK CLEARER FOR HARVESTERS.—George W. N. Yost, Corry, Pa., assignor to the Corry Machine Co.

I claim the combination of the track clearer, V, and the finger-bar shoe, W, a curved or bent part of the track clearer lying within a vertical mortise in and encircling part of the shoe, made and used as described, for grass and grain-cutting machines.

84,787.—SHOULDER BRACE.—Alexander Adamson, Washington, D. C.

I claim the shoulder brace, consisting of a single elastic strap crossing its centre (where it is fastened), and forming the double loops, B B, as herein described, and for the purpose set forth.

84,788.—BEE-HIVE.—Thomas R. Allen, Syracuse, N. Y.

I claim, 1st, The frame holders, F F, separately, and also in combination with the sills, a a, substantially as and for the purposes described.

2d, Also, the same parts, in combination with the comb frames, c c, substantially as described, and independent of and detached from the outside covering, C D

3d Also, the frame holder, F, constructed as described, in combination with the outer covering, C, and top, D, as set forth.

84,789.—CAR MOVER.—Fortune L. Bailey, Freeport, Ind.

I claim the arrangement of lever, A, bars, I I, and clamp, B, when combined with the griping devices on the lower ends of the rods, I I, as and for the purpose set forth.

84,790.—MOWING MACHINE.—L. D. Bidwell, Birmingham, Conn.

I claim, 1st, The arrangement of the revolving cutters, d, in a revolving head, so as to give to the said cutters a double movement, substantially as herein described.

2d, In comoination with the above, the finger bar, P, constructed and arranged so as to operate in conjunction with the said cutters, substantially in the manner set forth.

84,791.—APPLE QUARTERER.—Clark E. Billings, Warren, Vt.

I claim the arrangement herein described of the fixed knives, F, placed at right at right angles to each other, and having the central point, g, the plunger, B, hollowed out upon its under side, the plunger rod, C, guides, h, slotted lever, D, pin, i, spring, E, and stand, A, as herein set forth, for the purposes specified.

84,792.—COMPRESSION COCK.—G. E. Boissilier, St. Louis, Mo.

I claim the valve, D, having a screw-thread cut upon its outer surface, and furnished with a smooth socket, J, in which the squared end of the valve stem, C, is fitted, said stem having a disk, i, bearing against the under surface of the packing placed in the recess of the cap, B, and resting upon the lower packing disk, secured to the shell, A, by the screw cap, all arranged and operating as described, for the purpose specified.

84,793.—"DRESSER COPPER" FOR WARP DRESSING MACHINES.—W. H. Boyden, Rockland, R. I.

I claim, 1st, The combination of the rack B, and wires, m m, in a frame, A, substantially as and for the purposes specified.

2d, The arrangement of the rack, B, frame, A, wires, m m m, thumb-screws, n n, and clamp, T, substantially as shown and described.

84,794.—ELEVATOR.—William D. Brooks, Bethany, Pa.

I claim the cap, b, and rod, a, for sustaining the swiveled pulley, C, and a series of hooks, D, in combination with, and arranged, with relation to the adjustable flexible gravity track, as herein set forth and shown, for the purpose specified.

84,795.—BOTTLING MACHINE.—Henry Carse, Pittsburg, Pa.

I claim the screen, I, when the closing thereof is controlled by the downward motion of the filling head, and its opening by the receding motion of the corking piston or its carrying frame, through suitable mechanism, substantially as herein set forth.

84,796.—MEDICINE.—M. Cary, Racine, Wis.

I claim the ingredients herein named, compounded and pressed substantially as and for the purpose specified.

84,797.—SPADE.—Michael Connolly, Newark, N. J.

I claim the described construction of the spade, consisting of the blade, A, bent at its center, so that the two parts, a b, shall form an obtuse angle with each other, and provided upon its upper end, next the handle, with the widened foot-rest, C, as herein described for the purpose specified.

84,798.—PLOWSHARE.—George W. Cooper, Ogeechee, Ga.

I claim a cast-iron plowshare, A, made as described, without a landside plate, and with a concave front edge, substantially as and for the purpose set forth.

84,799.—FLUTING MACHINE.—William D. Corrister, New York City.

I claim the described arrangement of the operating screw, C, spring, i, nut, h, and bent bar, D, as herein set forth, for the purpose specified.

84,800.—HAY SPRADR.—Thomas C. Craven, Albany, N. Y.

I claim, 1st, The combination, with the ends of the central support, M, and caps, m, of the bars, N, substantially as and for the purpose set forth.

2d, The combination of the bars, N, having irregular shaped ends, with the heads or disks, L, and central support, M, substantially as and for the purpose set forth.

3d The combination of the caps, m, with the central support, M, substantially as and for the purposes set forth.

4th, The combination, with the frame or bearings which support the reel shaft of the eccentrics, E', substantially as and for the purposes set forth.

5th, The combination, with the eccentrics, E' and side rail, A, or their equivalents, of the arms, p, springs, s, and pins, r, substantially as and for the purposes set forth.

6th, The combination of the driving gears, K, with the wheels, F, substantially as and for the purposes set forth.

7th, The combination, with the frame which supports the reel and the frame which connects the journals of the wheels, F, of adjusting screw, R, and nuts, v v', substantially as and for the purposes set forth.

8th, The combination, with the frame of the machine and the driver's seat, of a metallic or other suitable guard or shield, W, arranged substantially as and for the purposes set forth.

9th, The combination, in a hay tedder, of a triangular or three-barred reel, with caps, m, constructed substantially as shown and described.

84,801.—ARTICLE OF PREPARED CODFISH.—Elisha Crowell, New York city.

I claim a new article of prepared codfish, made substantially as described.

84,802.—STEP COVER AND WHEEL FENDER FOR CARRIGES.—John Curtis, Cincinnati, Ohio.

I claim the bracket, F, depending rigidly from the carriage door, in combination with the hinged flap, G, arranged and adapted to operate in conjunction with a carriage step, in the manner and for the purposes set forth.

84,803.—SCOOP.—Thomas B. Davis, New York city.

I claim a scoop, having its body, A, constructed out of a single piece of sheet metal, B, cut and bent in the form, and soldered, substantially as herein shown and described.

84,804.—LABEL HOLDER.—Chauncey A. Dickerman, New Haven, Conn., antedated Nov. 30, 1868.

I claim the frame, A, through which is formed an opening, B, and upon the under surface, upon three sides of the opening, a, rabbet, a is formed, and so as to leave an opening through the end, C, for the insertion of the card, and having combined therewith a convex plate, D, the whole constructed and arranged so as to be applied and operate in the manner set forth.

84,805.—BEE HIVE.—A. P. Durant, Athens, Ohio.

I claim the combination of the base or bottom, A, bars, B B, and frames, C D, side pieces, E F, connecting bars, G G, frame, H, and cap, I, all constructed and arranged substantially as herein set forth.

84,806.—ELECTRO-MAGNETIC RELAY INSTRUMENT.—Charles Durant, Jersey City, N. J.

I claim, 1st, The curving of the shifting or sliding bolt, L, and also the curving of the opening in the armature or armature lever, through which opening said bolt moves and operates, substantially as for the purpose herein shown and described.

2d, The spring, U, in combination with the adjustable lever, V, or its equivalent, applied to the shifting or sliding bolt, L, moving through and upon the armature lever, substantially as and for the purpose set forth.

84,807.—HARROW.—O. W. Edwards, Bluffdale, Ill.

I claim 1st, The combination, with the beam, C, and shafts, B, of the harrow, of the spring F, substantially as and for the purpose described.

2d, The combination of the bushes, E, beam, C, shafts, B, and spring, F, as herein described, for the purpose specified.

84,808.—SAFETY BRIDGE FOR RAILWAY CARS.—Albert J. Elder, Kansas City, Mo.

I claim, 1st, Two plates, B B', one provided with a headed bolt, D, and the other with a slot, when hooked to the opposite ends of two railroad cars, substantially as and for the purposes herein set forth,

2d, The pivoted hooks, E E, held in place by the stirrups, I I, and secured to the platform, A', by the eyes, F F, in combination with the slotted plate, B', and plate, B, to operate substantially as herein set forth.

3d, The combination of the plates, B B', with the headed bolt, D, passing through the slotted plate, B', hooks, E and C, stirrups, I, and eyes, F, all substantially as shown and described.

84,809.—FEATHER RENEVATOR.—William H. Elliot, New York city.

I claim, 1st, The arrangement and combination of the draft pipe, f', steam pipe, e, central perforated shaft, f, and diaphram, g, as specified.

2d, The combination of hollow bearings, k, diaphragm, g, and draft pipe, f'', substantially as herein described.

3d, The combination of heater, c, central pipe, f, with its tubes, r, diaphragm, g, and draft piece, f'', substantially as set forth.

84,810.—WIRE FENCE.—George William Ensminger, Richland, Iowa.

I claim, 1st, A portable wire fence, formed in sections, composed of the wires, A, movable posts, A1 A2, slats, B, supports, C, and corner posts, D D1, constructed as herein described.

2d, The rods, K, and plates, k, and the screws, E, and nuts, e, in combination with the movable posts, A1 A2, and corner posts, D D1, arranged and operating in the manner herein described, and for the purpose specified.

3d, The wires, H, and the screws, G, and nuts, g, in combination with the movable posts, A1 A2, and corner posts, D D1, arranged and operating in the manner and for the purpose herein described.

84,811.—SHUTTER AND BLIND FASTENER.—W. B. Farrar, Greensborough, N. C.

I claim, 1st, The tumbler, E, in combination with the stop, G, both operating in connection with the bolt, B, as and for the purpose specified.

2d, The combination and arrangement of the springs, F and G, plate, E shoulder, n, pins, m m, knob, e, and bolt, B, having the notch, b, when constructed to operate substantially as and for the purpose set forth.

82,812.—BEEHIVE.—James T. Fife, Tyner city, Ind.

I claim, 1st, The lid, C, when so arranged as to cover the main hive, A, as well as the side boxes, B B, and to lock the door to the main hive, A, as well as the side boxes, B B, and to lock the door to the main hive and the end doors to the wings, substantially as and for the purposes herein set forth.

2d, The chamber, F, constructed as described, and provided with the entrance, k, for the bees to enter the chamber when hiving them, and with entrances a and b, for the passage of the bees from said chamber to the different honey boxes, substantially as and for the purposes herein set forth.

3d, The combination of the side boxes, B B, chamber, F, honey boxes, D D, and E E, ventilating chamber, o, frames, f f, and robber catcher, J, to make and constitute a complete beehive, substantially as and for the purposes herein set forth.

4th, The arrangement of the case, A, and wings, B B, with the chamber, F, honey boxes, E E, and D D, and cover, C, all constructed and combined in the manner specified.

84,813.—KNEE BOOT FOR HORSES.—James Finlay, N.Y. city.

I claim, 1st, The knee boot, A, constructed and provided as described, with fixed pads, a a', a, and adjustable pads, c c', to slide upon fixed or sliding straps, b b', substantially as herein specified.

2d, A knee boat, constructed with upward projection, A', for protection of the knee, and the leg above the knee, substantially as herein described.

84,814.—APPARATUS FOR ILLUMINATING RAILROAD CARS, STEAMERS ETC.—William Foster, Jr., and George P. Ganster, N. Y. city.

We claim, 1st, Holding the gasoline in sponge, or equivalent absorbent material, on movable plates, substantially as and for the purposes herein set forth.

2d, Receiving the gasoline in sponges, and exposing it to evaporation therefrom, by holding the sponges in layers in the several chambers, F G H, as and for the purposes herein set forth.

3d, The perforated tubes, N M, arranged as represented, in the chambers, F G, and to the absorbent material, arranged as and for the purposes herein specified.

4th, The movable platforms, f g, etc., in combination with the absorbent material chambers, F G, etc., and provisions for conducting the air back and forwards through the same, and adapted to be moved vertically by suitable means, as herein specified.

5th, The upright, K, and cam, j, in combination with the movable platforms, f g, etc., and arranged to operate therewith, in the manner and for the purposes set forth

6th, The reinforcing chamber, E, containing a fresh supply of volatile fluid, arranged relatively to the evaporating chambers, F G, etc., and their connections, substantially as and for the purposes herein set forth.

7th, The wicking, e2, arranged as represented, relatively to the reinforcing chamber, E, cock, e1, and evaporating devices below, substantially as and for the purposes herein set forth.

8th, The combination of a spring power or blowing mechanism, evaporating space, and absorbent material therein, forming an organized machine adapted for use in railroad cars, and analogous moving structures, with the advantages and for the purposes herein specified.

9th, The method, herein described, of illuminating moving structures by means of a portable gas apparatus, holding volatile fluid in capillary tubes, and operating by a force independent of gravity, and without disturbance from inertia, all constructed, combined, and arranged, substantially in the manner and for the purposes herein set forth.

84,815.—INSTRUMENT FOR TREATING FISTULA, ETC.—Edward F. Garvin, M.D., New York city.

I claim, 1st, The hollow conical slotted tube, a, with two or more slots, substantially as and for the purposes described.

2d, The cap, c, having the chamber, f, below tube, a, substantially as and for the purposes described.

3d, The plunger, g, operating in the supplementary chamber, f, also expander, h, both operating with or without screws, substantially as and for the purposes described.

4th, An expander, h, of equal diameter, operating in a conical tube of unequal diameter, as and for the purposes substantially as represented.

5th, All the parts of the described instrument, singly or in combination as and for the purposes described.

84,816.—BRICK MACHINE.—Evans Geary, Harrisburg, Pa.

I claim the arrangement herein described of the tempering tub, A, compressing plunger, B, adjustable feeding box, C, cut off, f, filling plate, o open bottom molds, r, and sliding table, B, all operated as herein set forth.

84,817.—MORTISING MACHINE.—D. L. Gibbs, Worcester Mass.

I claim, 1st, The employment, with the treadle, D, of a mortising machine, of a catch or stop mechanism adapted to retain said treadle in its depressed position without the aid of the foot, substantially as set forth.

2d, The combination of the arm, J, spring, g, beak, and lever, K, in the manner described, the whole constituting a catch mechanism, arranged to operate in connection with the treadle, D, substantially as herein set forth.

3d, The arrangement, with the main frame, A, of the treadle device herein described, and the devices for elevating and depressing the table, as shown and described.

4th, The combination with the chisel arbor, O, of the hand lever, P, spring, S, and cam, I, having projection, o, as shown and described.

5th, The arrangement with the guide frame, U, of the rack carriage, V, lever, 3, connecting rod, 4, standard, 15, stop, 11, weight and cord, 6 7, stud S, pinion, S', and hand wheel, W, as and for the purposes set forth.

6th, The arrangement in connection with the treadle rod, D', of the weight, D'', and double grooved pulley, Z, and cords or chains, z z', as shown and described.

84,818.—HARVESTER RAKE.—Mason Gibbs, Homer, Mich.

I claim the pinion and head, G, placed on the reel shaft, B, in connection with the sleeve, C, sector, O, with the teeth, R, levers, H L, and the cam, M, all arranged for joint operation, substantially in the manner as and for the purpose set forth

84,819.—STEAM ENGINERY.—William Goodwin, Boston Mass.

I claim the combination and arrangement of the steam cylinders, E E, their pistons, and cranked shafts, g g, with the driving shaft, B, gears, h i, and several cranked shafts, as described.

Also, the combination and arrangement of the two hollow or tubular annuli, D D, with the series of steam engines, and their cranked and main shafts g B, gears, h i, and frame, C, as set forth.

84,820.—ROOFING COMPOSITION.—Marien Gould, Chicago, Ill.

I claim the combination of the ingredients herein named, compounded substantially as and for the purpose specified.

84,821.—MATCH FOR LIGHTING CIGARS, AND FOR OTHER PURPOSES.—Gustav Graetz, Alexandria, Va.

I claim a match, constructed substantially as described.

84,822.—IMITATION STONE FOR BUILDING PURPOSES.—Thos. F. Hamilton, New Haven, Conn.

I claim the herein described process for forming blocks with a wood foundation and cement covering, substantially as herein set forth.

84,823.—CULTIVATOR.—C. A. Harper, Wheeling, Ind.

I claim, 1st, Connecting the wheel, D, to the cultivator beams or frame, A by means of the hinged or jointed slotted plate or frame, E, substantially as herein shown and described, and for the purposes set forth.

2d, Securing the flanged shaft, H, or clodder, in its bearings, by means of bails or heads formed upon the ends of said shaft, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the swinging arm, J, with the rear end of the flanged shaft or clodder, H, and with the frame of the cultivator, substantially as herein shown and described, and for the purpose set forth.

84,824.—BED SPRING.—H. N. Hemingway, Rochester, N. Y.

I claim the metallic holder, h, having double open sockets, c, (for holding the ends of the elastic loops, g,) and a projecting shank, s, with a lip, a, when constructed substantially as herein set forth, for the purpose specified.

84,825.—FLY TRAP.—James Hoover, Gratis, Ohio.

I claim, 1st, The revolving circular plate or disk, B, constructed on its upper side with the S-shaped shoulder or elevation, C, arranged and operating substantially as and for the purpose set forth.

2d, The employment of the trap door, F, provided with the spring bar, f, attached to bar, f' and spring, g, secured to bar, g', constructed, arranged, and operated substantially as and for the purpose described.

3d, Plattorm or casing, A, plate or disk, B, elevation or shoulder, C, casing or covering, D, flange or partition, d, trap door, F, spring bar, f', spring, g, bar, g', and reservoir, E, provided with opening, e, all combined, constructed, arranged, and operated substantially as and for the purpose set forth.

84,826.—BEEHIVE.—Henry O. Hughes, Judson, Mo.

I claim, 1st, The lower or bottom part of the hive, A, constructed as described, in combination with the hinged and sliding inclined doors, c c', and cone-like shaped piece or bottom, e, operated substantially as and for the purpose set forth.

2d, The employment of the cut offs, D D', constructed or grooved so as to change the draft or cut it off from one part of the hive to the other, arranged and operated substantially as described.

3d, Frame, B, outer and inner casings or walls, A A', doors, c c', bottom, e comb frame, C, partition or floor, g, honey boxes, g1, g2, doors, h and a, and ventilating cut offs, D D', all constructed, arranged, and combined, substantially as described.

84,287.—CABLE SHACKLE FOR BRIDGES.—Theodore G. Hulett,, Niagara, N. Y.

I claim the adjustable cable shackle, constructed and operating substantially as described.

84,828.—POTATO DIGGER.—Marion Jacobs, Sturgis, Mich.

I claim the arrangement of the plows, A, with the devices, D F and G, forming the digger, all as shown, and for the purposes described.

84,829.—CARRIAGE LOOP AND BILLET COVER.—Nicholas Jenny, Jr., Pittsburg, Pa.

I claim the metal sockets or receptacles into which the straps, B B, are inserted, and provided with flanges, b b, and rivets, b' b', in combination with the straps, D D, and metal plates, C C, all constructed, arranged, and operated as and for the purpose set forth.

84,830.—COFFEE URN.—George Jones, New Haven, Conn.

I claim, in combination with the periorated cylinder, C, within the body, A, of the urn, the arrangement of the annular chamber, B, and flange, a, of the cover, without communication from the chamber, B, to the urn below substantially as and for the purpose set forth.

84,831.—OX BOW PIN.—Henry P. Judson, Bethlehem, Conn.

I claim, 1st, The self-acting wire side springs, D D, when constructed and

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arranged as described, in combination with the pin C, and cross head, B, substantially in the manner and for the purpose set forth.

2d, The peculiar method, herein described, of attaching and supporting the side springs, D, consisting of the pipes F, and hooks a, in combination with the cross head, B, and loops, E, as and for the purpose specified.

84,832.—CLOTHES BOILER.—D. Kellogg, Ypsilanti, Mich.

I claim the removable caps, D, with their branch spouts, f, when combined with the perforated and slotted plates, a b, as herein shown and described.

84,833.—HARVESTER RAKE.—Wm. A. Kirby, Auburn, N. Y.

I claim, 1st, A combined rake and reel, the arms of which are capable of having a rolling motion on their axes, and in which any arm acting at the time being as a beater, or all of the beaters, can be raised or lowered while acting as such, by the operator riding on the machine, so that it or they may pass over the grain on the platform at any desired hight, substantially as described.

2d, Also, in a combined rake and reel, in which any arm thereof may be a rake or a beater, at the will of the operator, the so constructing and arranging the cam ways as that the arm that acts as a rake shall pass over the platform at a uniform fixed hight, while the arms that act as beaters may be raised or lowered in parallel lines, to pass over the grain on the platform at such hight as the operator may desire, substantially as described.

3d, Also, hanging the arms of a combined rake and reel at points remote from the center of motion of the wheel or head that carries them, so that in dropping or rolling the rake or beater arms into their working position they shall do so in a direction contrary to that in which the wheel, frame, or head that carries them is moving, and so that they may roll into a position to reach the adjustable-hinged lifting and lowering cam way, when used as beaters, and pass beyond or outside of it when used as a rake, substantially as described.

4th, Also, uniting a series of rakes and beaters to their journals, respectively, by curved or bent axles, crossing each other, one bent upward and the other downward, for the purpose of getting the centers of motion of the beaters or arms all in the same plane, so that they may all receive a uniform motion from the cam ways that guide or influence them, substantially as described.

5th, Also, the combination of the sleeve with its hinged dogs, the forked latch, K, and the cam way 12, for the purpose of enabling the operator on the machine to throw the arm that has been acting as a rake out, and hold it out, or to allow it or any other arm of the series to run into action as a rake while the remaining arms of the series act as beaters, substantially as described.

6th, Also, in combination with a series of arms that have a revolving, rising-and-falling, and a rolling motion on their journals, a hinged cam way that may be raised or lowered, to raise or lower the beaters, by means of a lever extending therefrom, so as to be within the reach of the driver upon the machine, substantially as described.

7th, Also, in combination with a series of arms, one of which acts as a rake, and the others as beaters, a series of hinged dogs, g, one of which shall serve to adapt an arm specially to raking, while the others shall adapt the other arms especially to reeling in the grain, substantially as described.

84,834.—HORSE SHOE.—Rudolph Laporta, New York city.

I claim the combination of the screw bar, C, with calk, I', nut, E, cross bar, H, having calks I I, with the shoe, A, when constructed and arranged to operate together substantially in the manner and for the purpose described.

84,835.—APPARATUS FOR MAKING PAPER BOXES.—Francois Leclere, Boston, Mass.

I claim for the purpose specified, the described process of using thin pulp in high columns over pervious formers, substantially as set forth.

Also, the combination of the wheel, b, with cylinders, r, arranged to rise and fall over the formers, m, substantially as and for the purpose set forth.

Also, the combination of the wheel, b, and slides conveying the formers, m, with inclines to move the slides outward and inward, as the wheel revolves, substantially as and for the purpose set forth.

Also, the combination with the cylinders, r, and their conveyer, b, of the valves, o, and the incline, c1, operative thereon, substantially as and for the purpose set forth.

Also, the process of condensing the pulp on the former, and expelling the water therefrom against atmospheric pressure by covering the pulp-covered former with a close vessel, d1, and admitting therein air under pressure, substantially as and for the purpose set forth.

Also, the process of removing the paper from the pervious former, by covering the pulp on the former with a cap fitting thereon, and admitting an air-blast within the former, substantially as and for the purpose set forth.

Also, the process for removing the paper from the cap which received it from the former, and for transferring the paper to a receiving block, by covering the receiver-block with the cap, and admitting an air blast into the cap, substantially as and for the purpose set forth.

84,836.—BOTTLE-FILLING APPARATUS.—John Matthews, Jr., New York city.

I claim, 1st, The combination of a sirup pump or charging device with the filling head or corking plunger of a bottling machine, in such manner that said pump or charging device is operated automatically by the filling head or its corking plunger, to admit sirup or other flavoring mixture to the bottle, while the aerated water, or other liquid to be sweetened or flavored is separately supplied to said bottle as it remains under the filling head, substantially as specified.

2d, The arrangement, essentially as described, of the sirup pump or charging device made adjustable, to regulate its charge, as specified, with the filling head or corking plunger, for operation together, substantially as herein set forth.

84,837.—ROTARY HORSE BRUSH.—W. W. McKay, Ossian, Iowa.

I claim, 1st, The combination, in a frame of a rotary brush, and a slide arranged for communicating rotary motion to the brush, alternately in one direction and the other, as and for the purpose described.

2d, The brush, D, arranged in combination with the frame, A, so as to be readily attached to and detached therefrom, substantially as and for the purpose described,

3d, The combination with the brush, D, of the adjustable scraper, F, substantially as and for the purpose described.

4th, The arrangement of the brush, D, frame, A, pulleys, E, cords, D', and slide, C, substantially as and for the purpose described.

84,838.—BRIDLE.—John McKibben, Lima, Ohio. Antedated December 1, 1868.

I claim the reins, E, provided with the stops, h, in combination with the bit, having its side bars, z, provided with guides, f f, for the reins to pass through, and the tubes, e, at the rear edges of the blinders, through which the reins also pass, all arranged substantially as and for the purpose set forth.

84,839.—EXTENSION LADDER.—Warren Morehead, Parkersburg, W. Va.

I claim the arrangement of the sliding ladder, B, constructed as described, triangular ladder, A, with its guides, d d, and the latch, D, and slide, E, all constructed and operating as shown and described.

84,840.—ENVELOPE.—Charles R. M. Pohle, Richmond, Va. Antedated November 30, 1868.

I claim the closing of the envelope by the action of the double seal, substantially as described.

84,841.—WATER ELEVATOR.—L. Raymond, Greene, Ohio.

I claim the combination of the swing or trapeze, F, the inclined guide, G, and the cords and pendants, D E, all substantially as and for the purpose set forth.

84,842.—FLOUR COOLER.—Joseph S. Reynolds, Wauconda, Ill.

I claim the arrangment herein described, of the shaft, B, and agitators, D D, with the cooling pans, A A, provided with spouts, a' a', near their peripheries and screw conveyers, C, as and for the purpose set forth.

84,843.—BRIDLE BIT.—William S. Robbins, New Bedford, Mass.

I claim, 1st, The inner bit, B, attached to the outer concave bit, A, by means of the curved end springs, b, whereby the inner bit is adapted to be drawn out of the bit, A, its entire length, and parallel with said outer bit, as herein described for the purpose specified.

2d, Attaching the bridle to the outer bit, A, and the driving reins to the inner bit, B, as herein described for the purpose specified.

84,844.—HAND SUPPORTER FOR PIANOS, ETC.—Charles Sangalli, New York city.

I claim the apparatus hereinabove described, or its equivalent, suspending the hands or resting the wrists, without hindering the free movements of the fingers, and keeping thereby the hand or wrist, and in consequence thereof, the fingers upon the key board in the position desired, at the same time unhindering all the motions required to be made to use the same, and to play upon an instrument, as above described.

84,845.—DIES FOR MAKING CARRIAGE AXLES.—W. W. Simmons, Birmingham, Conn., assignor to himself, R. M. Bassett and T. S. Bassett.

I claim the dies, E, constructed as shown and described, for the purpose hereinbefore set forth.

84,846.—PUMP.—Oscar Snell, Williamsburg, Ohio.

I claim, in combination with the pumb proper, A, the valve chest, F, constituting also an air chamber, the slide valve, G, tube, K, and discharge pipe, L, when constructed and arranged to operate in the manner and for the purposes herein set forth.

84,847.—PLANING MACHINE.—Henry D. Stover, New York city.

I claim the frame of a planing machine, constructed, in the manner described, so that the arm cutters, F F, may operate simultaneously with the cylinder, D substantially as and for the purpose set forth.

2d, The oscillating clamp, R, when constructed in the manner and for the purpose described.

3d, The adjustable brackets, N, in combination with the frame, E, for supporting the driving shaft, O, and tighteners, when constaucted and arranged as described.

4th, The clamp, R, when provided with a single hook at each end, to take hold of pins inserted in the sides of the carriage, as described.

5th, The iron uprights, E, in combination with a bed, A, when such bed is used for the support of the vertical and horizontal cutters, D and F F, in the manner described and for the purpose set forth.

84,848.—HYDRANT.—Solomon Tice, Cincinnati, Ohio.

I claim the combination, substantially as described, of the open-ended and perforated cylinder, A a, chamber, B b, inlet pipe, C, discharge pipe, D, collar, E, valve seat, F, packing G, stem, K, plunger, M m, valve, F, and contracted passage, P, all substantially as described, and for the object explained.

84,849.—CLOTHES DRYER.—Jarvis B. White, Detroit, Mich.

I claim the clothes dryer, consisting of the standard, A, part, C, hinged near the foot of standard, A, and carrying the clothes rack, D E F, straps, G, and windlass, H, all arranged and operating substantially as and for the purposes set forth.

84,850.—APPARATUS FOR CLEANING RAGS.—George L. Witsil, St. Louis, Mo., assignor to himself and T. L. Bates, Philadelphia, Pa.

I claim an apparatus for the uses specified, consisting of the cisterns, pipes, stop cocks, and air pumps arranged for operation substantially as set forth.

REISSUES.

77,476.—MACHINE FOR MAKING NUTS.—Dated May 5, 1868; reissue 3,223.—Matthew H. Foster and Hubert C. Hart, Unionville, Conn.

We claim, 1st, The combination of the sliding bed, B, with the mechanism for cutting, the mechanism for forming, and the mechanism for punching and swaging, substantially as described.

2d, The arrangement of the formers, f f', the blocks, k' k3, the set, t, the die, x, and the punch, p, constructed and operated as herein described.

3d, The peculiar arrangement of the cams, a b c d e s s" F, by which the several parts of the machine are made to operate at the proper time, substantially as herein set forth.

4th, The improved nut machine, consisting of mechanism constructed, combined, and arranged substantially as herein set forth.

82,683.—CHILDREN'S CARRIAGE.—Dated Oct. 6, 1868; reissue 3,224.—Francis Boylston, New York city.

I claim, 1st, The combination and arrangement of the fixed axle, A, having two revolving wheels thereon, and sills or supports, B B, when the same are attached to the front part of a children's carriage or perambulator, substantially in the manner herein shown and set forth.

2d, Attaching the fixed axle, A, to the supports, B B, by means of the brackets, C C, and secured by the screws, a a, or their equivalents, the whole of the parts being made and combined with a children's carriage or perambulator substantially in the manner herein shown and described.

3d, The combination and arrangement of the fixed axle, A, having thereon two loose wheels, D D, brackets, C C, and sills or supports, B B, the whole being made and combined, with respect to each other and to a children's carriage or perambulator, substantially as and in the manner herein shown and set forth.

45,302.—APPARATUS FOR CARBURETING AIR.—Dated Feb. 7, 1865; reissue 3,225.—Edmon L. Mix, Rochester, N. Y., and the Monumental Automatic Gas Machine Company, Baltimore, Md., assignees by mesne assignments of Hugh L. McAvoy.

We claim, 1st, An apparatus for manufacturing air gas and enriching other gas, in which the carbonaceous matter is inclosed within an air forcing apparatus, consisting of a gravitating air holder and water receptacle, substantially as described.

2d, Manufacturing air gas by the described mode of using a holder, C, to contain air, receive the carbonaceous matter as it rises from the oil in the form of vapor, and force the gas into a pipe, wherein it is conducted off, as explained.

3d, The plate, E2, employed in connection with the pan, E, to cause the air to pass to the pipe, B, in contact with the oil, and in a state of compressure, substantially as described.

4th, The sealing device consisting of the cup, F, cylinders, G G', and a body of liquid between the latter, substantially as described.

5th, An apparatus for carbureting air in which the vessel holding the hydrocarbon liquid is contained within the gasometer, in contact with the water in the cistern thereof, substantially as and for the purposes set forth.

25,978.—TACKLE BLOCK.—Dated Nov. 1, 1859; reissue 1 534, dated Sept. 8, 1863; reissue 1 932, dated April 11, 1865; reissue 3,226.—Isaac E. Palmer, Hackensack, N. J.

I claim the construction of a tackle block and pulley, whereby the rope or fall, when desired, may be clamped between a portion of the pulley and a portion of or surface connected with the block, substantially as herein described, by simply leading it in a direction oblique or lateral to the plane of revolution of the pulley, without tying, or the use of dogs or movable stops, or any other means of fastening.

30,446.—MAGAZINE FIRE-ARM.—Dated Oct. 16, 1860; reissue 3,227.—Winchester Arms Company (assignees by mesne assignments of B. Tyler Henry), New Haven, Conn.

We claim, 1st, In combination with the hollow breech pin, the spring catch m, on the breech pin and the piston, arranged for central or rim fire, or both, substantially as and for the purpose set forth.

2d, In combination with the carrier block, E, and the spring catch, m, placed on top of the breech pin, L, the so forming of the top of the said carrier block, near the rear end, as shown at d5, fig 4, as to strike the cartridge forward of the center, and thus raising the forward end of the cartridge, while the rear end is held down by the spring catch, tripping it over and freeing it from the spring, and ejecting it from the gun, substantially as described.

DESIGNS.

3,277.—SNUFF BOX.—F. C. Heiser, Brooklyn, E. D., N. Y.

3,278 to 3,290.—CARPET PATTERN.—Elemir J. Ney (assignor to the Lowell Manufacturing Company), Lowell, Mass. Thirteen Patents.

EXTENSIONS.

MANUFACTURING LEATHER BANDING FOR MACHINERY.—George Miller, Providence, R. I. Letters Patent No. 11,902, dated Nov. 7, 1854.

I claim my improved manufacture of round banding, as made substantially as described, that is to say, by reducing a strip of leather or other suitable material, to the shape denoted in fig. 1, and subsequently rolling and cementing it together into that essentially as exhibited in fig. 2, of the drawings hereinbefore mentioned.

BUCKLE.—Stephen E. Booth, Orange, Conn., administrator of S. S. Hartshorn, deceased.—Letters Patent No. 11,892, dated Nov. 7, 1854; reissue No. 2,955, dated May 26, 1868.

I claim, 1st, A buckle in which the tongues are formed from a single piece of metal, and constructed so as to clasp the divided side and turn freely thereon substantially in the manner herein set forth.

2d, The combination of the two parts or loops, one side of one of which is divided, and the two parts or loops hinged together as described, and the tongue clasped and hinged upon the divided side, as set forth.

SHINGLE MACHINE.—Harry H. Evarts, Chicago, Ill.—Letters Patent No. 11,858, dated Oct. 31, 1854.

I claim placing the blocks to be sawed into shingles in a rotating carriage, which is combined with inclined tables, p p (or a single table), and with saws o o (or a single saw), in such a manner that the blocks will be carried continuously forward and be automatically operated upon to convert them into shingles, substantially as herein set forth.

I also claim the arrangement of the weighted levers, H H, the fastening teeth, i i, and the inclined planes, l l, with each other and with the inclined tables, p p, and the other series of teeth in the ledge, r, substantially as herein set forth.

I also claim presenting the sides of the fibers of the wood to the action of the saws in the sawing of shingles, or equivalent articles, for the purpose of giving them smoother surfaces than can be produced by the usual mode of sawing, substantially as herein set forth.

DAGUERREOTYPE CASE.—Eliza Mascher, Philadelphia, Pa., administratrix of John F. Mascher, deceased.—Letters Patent No. 9,611, dated March 8, 1853; additional improvement No. 134, dated Feb. 19, 1856.

I claim constructing a daguerreotype case with an adjustable flap or supplementary lid, C, said flap or lid, C, being within the case, and having two ordinary lenses, D D, placed in it, by which, upon adjusting the flap or lid as shown, a stereoscope is formed of the case, and the two daguerreotypes, E E, by binocular vision, are apparently formed into a like figure.

ADDITIONAL CLAIM.—The combination and arrangement of a series of leaves, of any suitable material, containing photographic or other pictorial representations (interspersed or not with blank or printed leaves), with the supplementary lid or adjustable flap containing a lens or lenses as described, the same being united or bound together so as to form a book, substantially in the manner and for the purposes described.

LOOM FOR WEAVING FIGURED FABRICS.—George Crompton, of Worcester, Mass.—Letters Patent No. 11,933, dated November 14, 1854; reissue No. 639, dated December 28, 1858.

I claim combining with hook jacks which are connected with the harness, and with the mechanism for operating them to open the shed, substantially as described, a pattern chain, or cylinder, constructed with two or more patterns, and operated so that either of the patterns can be made to act on the hook jacks to place them in the required position to be operated upon by the mechanism for opening the shed, substantially as described.

I also claim, in combination with a pattern chain, arranged with two or more patterns in the direction of its length the mechanism, substantially such as herein described, for changing the movements of the chain to effect the changing of the pattern, as described.

I also claim placing two or more patterns upon the rods of a pattern chain, side by side, and operating them in succession by vibrating the chain laterally, in the manner substantially as described.

I also claim pivoting the lifting and depressing rods, G P at one end, the other being made adjustable, in the manner and for the purpose set forth.

And I also claim moving the rods or jacks out of contact with the rollers on the pattern chain before the chain is moved, by means of what are termed the vibrating fingers, or the equivalents thereof, substantially as described.

SEWING MACHINE.—Charles Parham, of Philadelphia, Pa. Letters Patent No. 11,971, dated November 21, 1854; reissue No. 1,562, dated November 3, 1863.

I claim 1st, So forming and constructing the shuttle driver of a sewing machine that, while it performs the required duty of driving the shuttle, it serves to maintain the latter in the desired proximity to the plate, C, as set forth.

2d, The combination of the driver, A, shuttle, B, and stationary plate, C, the whole being formed and arranged substantially as described, so as to retain the shuttle during its flight in its proper position for the purpose specified.

PRESSER BAR FOR PLANING MACHINE.—Clara M. B. Snow, of Independence, Iowa, executrix of Harvey Snow, deceased.—Letters Patent No. 11 984, dated November 21, 1854.

I claim combining the pressure bar, H, with the rotary cutters, so as to secure the same relative position of the inner edge of the bar, and the path of the cutting edge in holding and cutting the surface of a board throughout its varying thickness, substantially as described.

ANCHOR.—Samuel H. Miller, Dedham, Mass.—Letters Patent No. 9,076, dated June 29, 1852.

The nature of my invention consists in having two separate shanks (marked, A and B, in fig. 1 of the enclosed drawings) and flukes to them, C and D, the shanks being confined together near the rings by the bolt, E, secured at one end by a large head, and at the other by a strong nut or key, F, and separated at their elbows or crowns the length of one of the flukes by a spur or brace projecting from the shank, A. In the other shank, B, there is a hole through which the end of the spur, G, passes, and is secured by a nut or key at H. The flukes are pointed in opposite directions, and so disposed that it is impossible for the anchor to lie otherwise than with one of the flukes in the ground.

Specification 2.—There being no stock to this anchor, it is not liable to become "stock foul" in "letting it go," nor can a vessel be "stock rode," as it is termed, by the stock entering the ground and being dragged along it until it meets a hard vein of earth or a stone, when the stock is bent or broken, and the anchor is useless. But in this form, the instant a strain comes on the cable, the anchor enters, and is drawn down into the mud until the broad surface of the fluke presents its full power of resistance. The fluke sinks readily in the ground from the effect of its plowshare-like point, which passes the earth on one side, instead of lifting up and breaking it.

Specification 3.—By unscrewing the nut, F, and withdrawing the bolt, E, which connects the two shanks at the rings, and also detaching the shank, B, from the end of the spur, G, both flukes can be turned downward, and geared as in fig. 2 of the drawings, becoming in effect a double "mooring anchor," which sinks with certainty both flukes in the ground by attaching to the middle of the spar chain, I, which connects the two elbows, and is twice the length of one of the flukes, an empty beef barrel, small water cask, or anything of sufficient buoyancy to insure the turning of the flukes down by its resistance to the sinking of the anchor. To this chain the buoy rope is also made fast. In many ports ships are obliged to lie moored, and much inconvenience is experienced with the old form of anchor, by the fluke which stands up from the ground catching the cables of the ships as they sheer about with the wind or tide. In my anchor this difficulty is entirely obviated, for, when the flukes are sunk in the mud, there is nothing above the ground which can catch a chain or hawser. In anchoring upon a lee shore, the anchor, being disposed as above, will take a double hold of the ground, thus rendering the anchorage more secure.

Specification 4.—If one of the flukes or shanks should be broken near the elbow or crown, (the place where they usually break), this anchor can yet be made available by lashing a spar of the length of the shank and one fluke, across the remaining shank, to the spur or brace, G, as in fig. 3. It then becomes the same as the common one fluked mooring-anchor, and can be used in the same manner, or as the double anchor described in the third specification, by securing to the ends of the spar a temporary stock, a rope of twice its length, and from the middle or bight of that extend another to the ring at the elbow, then at the bight, or where the ropes are united, secure a buoy or small cask, and let go the anchor, the fluke will strike the point into the ground. Or it can be lowered down by a rope made fast to the elbow or crown, as is the mode with the mooring anchor now in use. In the old form of anchor, if the shank is broken, both flukes are lost, and the anchor is useless.

Specification 5.—It is frequently necessary to carry out anchors in boats; which service, if in the night time, or in a heavy sea, is always attended with great peril, because of the anchor stock lying athwart the boat's gunwales, embarrassing the men in rowing, and its liability to turn, and the stock catching in the boat's quarter, when about to be let go. In carrying out this anchor of my invention, there is no such danger. There being no stock, it lies along the middle of the boat, with flukes over the stern; and when the hawser is run out, the anchor follows, without the possibility of fouling or catching in the boat.

Specification 6.—By the mode in which this anchor is made, greater strength is insured than can be obtained in the old one with the same weight, each shank and fluke being in shaft forged into shape, and then heated at the proper place, and bent into the form requisite, without the necessity of welding any part but the spur or brace of the stock. In the old anchor there must be a weld (and commonly there are two) at the crown; and there they most frequently break.

Specification 7.—While making a passage, this anchor can be readily stowed by withdrawing the key, H, and lifting the shank, B, from the spur, G, and laying it upon the shank, A. The anchor, thus closed, occupies but little space. This can be done while the anchor hangs at the cat-head, and with greater ease than when on the deck, by taking out the key, drawing of the shank, B, and allowing it to drop to its fellow. Then, by the tackle hooked to the spur chain, it is taken over the ship's side.

Specification 8.—In case of extremity this anchor can be separated and used as two, by lashing across the shank, A, at G, a spar for a temporary stock, and driving through the hole in the shank, B, at H, a handspike, and lashing thereto a spar, as on the shank, A; then rig them with buoys, as described in specification 4, and illustrated in fig 3. Thus arranged, the anchor being provided with two rings, can be shackled to two chains or cables, thereby securing greater safety to the ship than if moored with but one.

What I claim as my invention, and desire to secure by Letters Patent, is the above described anchor for holding ships.

Mrs. A. St. John, of Rochester, says that, during the past ten years, she has made more than three thousand five hundred vests with her Wheeler & Wilson machine, besides doing her family sewing, and that she has made over twelve hundred vests with the needle now in use.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Bennington and Rutland Railroad Company are to extend their road to the marble quarries at West Rutland.

A single rubber manufactory in Providence, R. I., employs five hundred hands.

The lumbermen at Burlington, Vt., have adopted the ten hour system.

Mile posts are now being erected on the line of the Concord Railroad.

The earnings of the Central Pacific Railroad for October exceeded $300,000.

Business and Personal.

The charge for insertion under this head is one dollar a line. If the Notices exceed four lines, an extra charge will be made.

A rare chance for business investment is offered in the sale of a foundery and machine shops at New Haven, Conn. The oldest in the State. Reputation established. See advertisement, back page.

Extension table—self-acting. All the leaves and means of operating them, contained in the frame of the table. Rights for sale, Send for circular, to Chas. F. Pease, Boston, Mass.

Send $1 to Milton Bradley & Co., Springfield, Mass, for series No. 6, Zoetrope Pictures.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

Wanted to purchase a set of pulley patterns, either in the rough or finished state, ranging from 6-in. to 40-in. diameter, with 8 in. faces. Any person having the same for sale will please address W. P. S., No. 31 Reed st., Pittsburgh, Pa.

Manufacturers and machinists wishing to purchase planing or shaping machines, drills, lathes, or steam engines, will find it for their interests to consult the advertising columns, back page, of this paper.

Wanted—A new or 2d-hand machine for finishing and putting up merinos and other piece goods. Send price and description to Teasdale Bros., Cincinnati, Ohio.

Look out for orders, manufacturers and machinists. See manufacturing news of the United States in Boston Bulletin, which will post you where to solicit them. The Commercial Bulletin, Boston, $4 a year. Advertisements 17c a line.

Millstone-dressing machine, simple and durable. Also, Glaziers's diamonds, and a large assortment of "Carbon" of all sizes and shapes, for all mechanical purposes, always on hand. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

Wanted—A good man, thoroughly posted in the working of spoke and wheel-making machinery, as foreman in a wheel factory at Marietta, Ohio. A good salary will be paid to one who can come well recommended. Address F. W. Minshall, Sec., Postoffice box 204, Marietta, Ohio.

See A. S. & J. Gear & Co.'s advertisement elsewhere. Keep posted.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

For Hackle Pins, etc., address J. W. Bartlett, 569 B'dway, N.Y.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for Lithograph, etc.

Portable pumping machinery to rent, of any capacity desired, and pass sand and gravel without injury. Wm. D. Andrews & Brother, 414 Water st., New York.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

The paper that meets the eye of all the leading manufacturers throughout the United States—The Boston Bulletin.

Winans' Boiler Powder, N. Y., removes and prevents incrustations, without injury, or foaming; 12 years in use. Beware of imitations.

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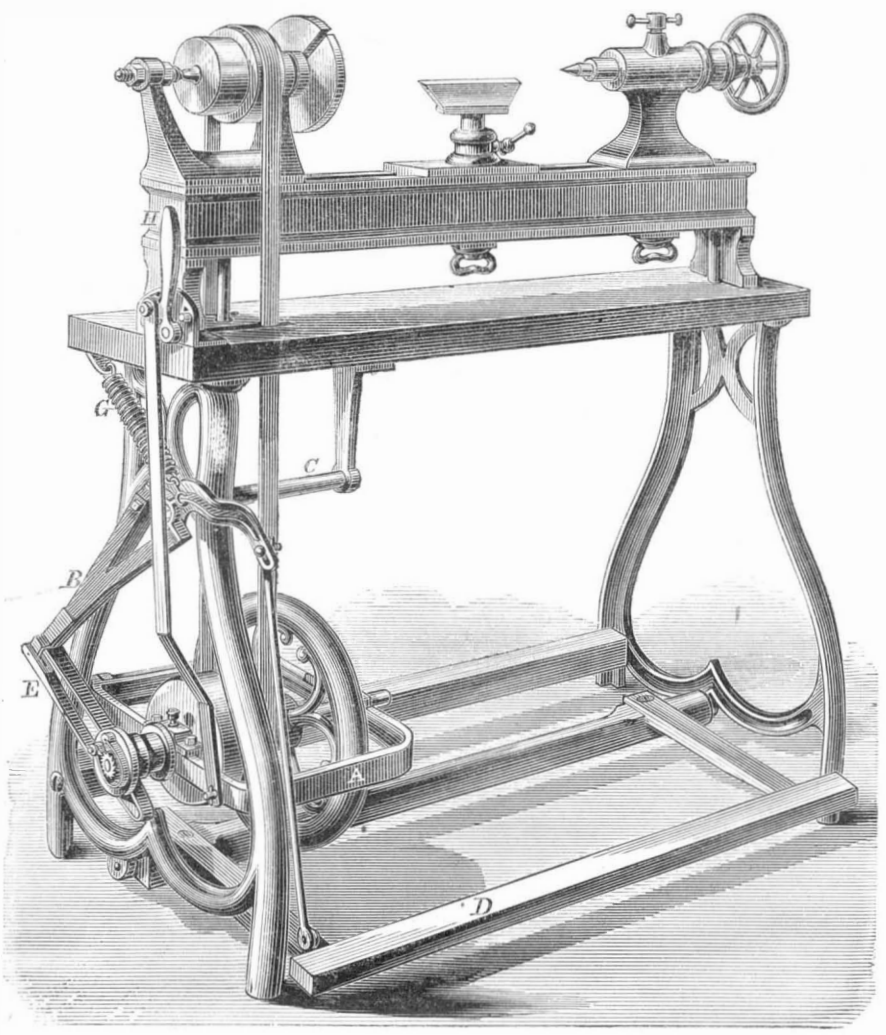
Improved Lathe for Dentists, Model Makers, etc.

Dentists, amateurs, and others who use the foot lathe, experience more or less annoyance from their inability to stop the head spindle suddenly, the momentum of the fly wheel being difficult to overcome. This entails a great loss of time, particularly if the work is to be examined frequently. The lathe herewith represented is intended to obviate these objections.

The driving shaft, carrying the cone pulleys and a small fly wheel, is mounted in a frame, A, under the head stock of the lathe, and is pivoted on stands secured to the rear bar of the lathe, so that the frame, with shaft and wheels, may be raised or lowered to a certain extent.

The wheel shaft projects beyond the end of the lathe, and carries a fixed ratchet wheel at the extreme end. Between the ratchet and the box of the shaft is a flanged pulley, turning loosely on the shaft, sufficiently wide to receive two narrow belts side by side. One of these is attached to the long arm of a pendulum lever, B, the shaft, C, being its fulcrum. To the other, or short arm of the lever, is pivoted the rod that connects with the treadle at D. Another narrow belt, which the flanged pulley receives, is fastened at one end to a guide bar or bow, E, pivoted to the long or lower arm of the lever, B. The other end of both these belts is secured to the face of the loose-flanged pulley, in such a manner that when one is wound on the pulley the other is unwound, as when the foot of the lever is furthest from the shaft the strap secured to B is run out, while that secured to E is wound up. A spring, G, balances the weight of the treadle and its appurtenances. A pawl and light spring on the outer head of the flanged pulley serves to makes connection between the loose pulley and shaft by means of the ratchet. A bell-crank lever at H connects by a rod with the pivoted frame, A, by which the frame can be raised to slacken the belt, or lowered to tighten it. When raised, the driving belt will be slackened, so that the spindle may be instantly stopped. The treadle stops as soon as the foot is removed, and always at the highest point, while the driving shaft continues to revolve. It is evident that a very high speed may be obtained by this contrivance, while the stroke of the operator's foot may be of any limit required.



FOOT LATHE WITH IMPROVED DRIVING ATTACHMENT.

E. P. Rider, 220 Center street, New York city, manufactures these lathes largely to order for model makers, mathematical instrument makers, watchmakers, etc.

Improvement in Oiling Shaft Bearings and Loose Pulleys.

Some months ago we took occasion to speak, through our columns, on the enormous waste of lubricating oil in shops and manufactories, referring not only to oil used for tapping, cutting bolts, turning, and polishing, but to the waste in lubricating journals and bearings. The ordinary way of filling the cup on the top of a box, eccentric, or strap of a connecting rod, must of necessity entail a large percentage of waste. Centrifugal force throws the oil from the shaft, and it escapes from the box of a shaft at the ends and drops to the floor or is received into drippers. If contained in a cup on an eccentric, or strap embracing a wrist pin, the oil is thrown, in the same way, from the shaft rather than toward it. Loose pulleys, especially, waste the oil intended for their lubrication. At every revolution the oil is thrown out through the holes made for its reception.

If cotton waste or other porous material is used to retain the oil and conduct it to the frictional surface, it soon becomes foul and needs to be frequently changed and fresh oil introduced. All the usual methods of oiling introduce the oil to the surface of the shaft from the outside; but the plan represented in Fig. 1 of the engravings is entirely different; the oil is placed in the center of the shaft and is fed or thrown outward to the surface. The engraving represents the ordinary counter shaft for a screw-cutting engine lathe, part of it in section and part in perspective. The shaft is hollow, plugged at the end by a screw. At the points where the journals come, a series of small holes are drilled from the outside to the central cavity; so, also, where the loose pulleys run and the clutch works.

These holes may be drilled in line or on a spiral, as may be considered most advisable. The internal cavity of the shaft is filled with oil through a hole in the side, that is stopped with a screw having a leather or rubber washer under its head. The apertures for the escape of the oil to the outside of the shaft are closed by little disks or plugs of leather to prevent undue leakage. Leather is found to permit the oil to pass freely through, sufficient for the purposes of lubrication, while the machinery is in motion, but, still, to prevent leakage when the shaft is at rest. Mr. Olmsted says that a countershaft for a lathe swinging fourteen inches, having two loose pulleys and two bearings, although in constant use, was run for eighteen months without re-oiling, the oil being contained in the shaft the space of which was that of a tube thirty inches long and half an inch in diameter. Other statements of a similar nature, by those who have made satisfactory tests of this method during the past four years, and are still using it, might be repeated. It is applicable to nearly all bearings and loose pulleys, and is in use on engines to oil crank pins, eccentrics, crossheads, etc. It is especially valuable on wood-working machinery which requires a rapid motion. The oil, being preserved from the air, does not oxidize or thicken, but remains pure and limpid.

There are some bearings in machinery where a hollow shaft is inconvenient or impossible. In such a case the inventor proposes a cup oiler as shown in Fig. 2. The globe is preferably of glass to exhibit the state of the oil. A stem of metal is inserted into the lower part of the globe, fitting by means of a gland of cork, the other end passing through the cap of a box, or the strap of a connecting bar or pitman, and reaching the surface of the shaft, or wrist pin. To hold the stem in the requisite position a moveable friction ring on the stem rests on the outside of the box, and the bottom of the stem or tube is plugged with a leather disk resting on an internal collar, as seen in the engraving.

Fig. 2

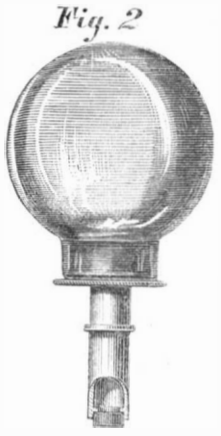
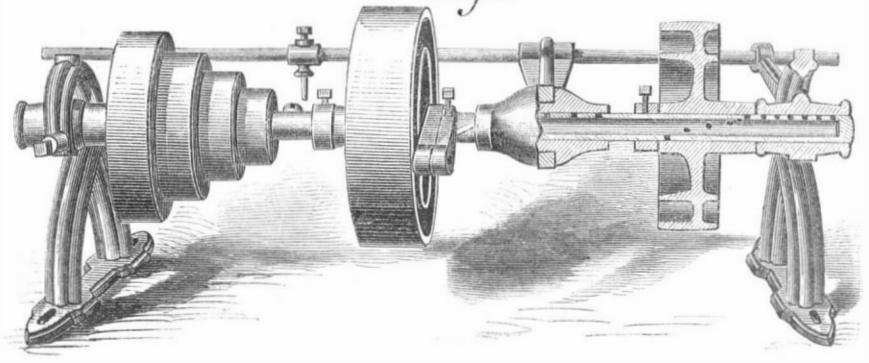


Fig. 1



OLMSTED'S PATENT SELF-OILER.

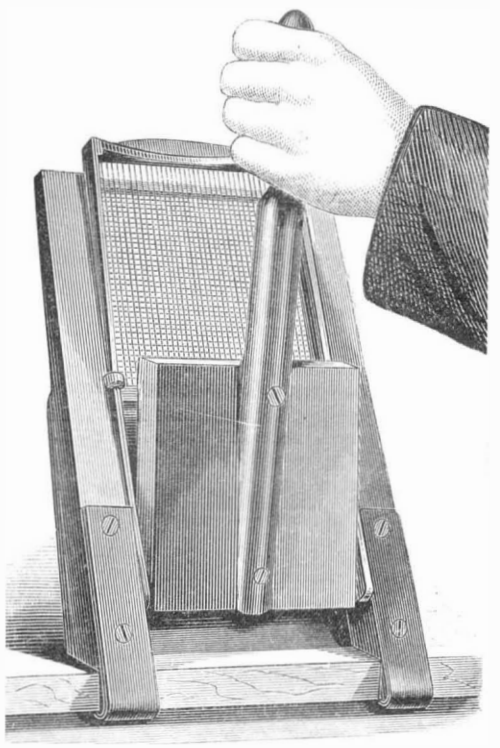
These oilers have stood a long and severe test, and been found to operate satisfactorily. The rotation of the shaft wipes the oil that exudes through the leather on to the shaft; but when the shaft is at rest the oil will cease to pass through and none will be wasted. There is nothing to get out of order, no screws to adjust, and no continual watching necessary.

Patented January 21, 1868, by L. H. Olmsted, manufacturer of fine machinists' tools, whom address at Stamford, Conn., or No. 1, Centre street, New York City.

BROWN'S VEGETABLE MASHER.

The pulping of vegetables preparatory to cooking or serving on the table is somewhat laborious, and the necessity of removing the rind or skin before this can be done, demands considerable time. To save this time and avoid much of the labor, the implement seen in the engraving has been contrived. By it potato, turnip, squash, stewed apple, and other vegetables and fruits, may be mashed or reduced to pulp without removing the skin, which is rejected and passed to one side.

It is a simple frame consisting of two uprights, or inclines, connected at top and bottom by cross bars, and adapted, as seen, to fit on a table or bench. The upper portion of the main frame has a series of parallel rods or wires, the interstices of which are



small enough to prevent the passage through of parings or skin. Directly over this is another similar frame with wires running transversely to those of the main frame, so that the two combined form a sieve. A crusher, consisting of a block fitting the sieve, and a handle, has pivots or projections on its lower end traversing in slots in the sides, by which it may be moved up and down or to and from the sieve.

The operation is perfectly simple. In mashing potatoes, for instance, the potato is fed in with one hand while the masher is worked by the other; the pulp passing through the sieve, and the peel dropping down from the front of the sieve into a pan or other receptacle. The implement may be used in any position—horizontal, inclined, or vertical. Its parts may be easily separated for cleansing.

Patented through the Scientific American Patent Agency, May 19, 1868, by E. Brown. For further particulars address E. Brown, or Geo. D. Wright, at Burlington, Vt.

Excitement and Short Life.

The following, by an unknown writer, accords with our observation: The deadliest foe to a man's longevity is an unnatural and unreasonable excitement. Every man is born with a certain stock of vitality, which cannot be increased, but which may be husbanded or expended rapidly, as he deems best. Within certain limits he has his choice, to live fast or slow, to live abstemiously or intensely, to draw his little amount of life over a large space, or condense it into a narrow one; but when his stock is exhausted he has no more. He who lives abstemiously, who avoids all stimulants, takes light exercise, never overtasks himself, indulges no exhausting passions, feeds his mind and heart on no exciting material, has no debilitating pleasures, lets nothing ruffle his temper, keeps his "accounts with God and man duly squared up," is sure, barring accidents, to spin out his life to the longest limit which it is possible to attain; while he who lives intensely, who feeds on high seasoned food, whether material or mental, fatigues his body or brain by hard labor, exposes himself to inflammatory disease, seeks continual excitement, gives loose reign to his passion, frets at every trouble, and enjoys little repose, is burning the candle at both ends, and is sure to shorten his days.

MR. A. L. HOLLEY, Engineer of the Pennsylvania Steel Works, at Harrisburg, has also been appointed engineer of the Bessemer Steel Works of Messrs John A. Griswold & Co., Troy. These works, originally built by Mr. Holley, and consisting of a two tun converter and a pair of five tun converters and plant, were partially destroyed by fire in October. The small converter is already in operation and the works will be immediately rebuilt and considerably extended.

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VOL. XIX., No. 26...[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, WEDNESDAY, DECEMBER 23, 1868.

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(Illustrated articles are marked with an asterisk.)

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TO CITY SUBSCRIBERS.

The SCIENTIFIC AMERICAN will hereafter be served to our city subscribers either at their residences or places of business, at $3.50 a year.

Theodore Tusch, a very energetic and reliable young man, and for many years employed in this office, is authorized to deliver the paper, and to collect subscriptions and receive orders for advertisements.

WE propose during the coming year to devote more attention to the illustration and description of leading branches of manufacturing. We are prepared to send our artists, and competent writers to points within reasonable limits to take the necessary sketches, and prepare the descriptions. The advantage of such illustrated articles in a journal so widely circulated as the SCIENTIFIC AMERICAN, must be apparent to every enterprising manufacturer.

ONE of our associate editors has recently visited Pittsburgh, and we are now preparing illustrations of the largest iron works in that city, to be published soon, with an account of the operations and processes carried on at the works.

THE present number closes the volume. We are aiming at a subscription list of at least fifty thousand. This can only be accomplished by the co-operation of our present patrons, who have always generously responded to our appeals. We urge them now to speak a good word for the SCIENTIFIC AMERICAN. By so doing they can induce some of their neighbors to join in making up a club. If ten or more names are sent, the subscription is $2.50 a year. Any one who will send us twenty names and $50, can add his own name to the list.

AGENTS who receive their weekly supply of the SCIENTIFIC AMERICAN through news companies, are urged to canvass their localities. By a little effort among intelligent mechanics and manufacturers, they can add largely to their lists. We will send specimen numbers, when desired, for that purpose.

WHAT more valuable present can be made to young mechanics than a year's subscription to the SCIENTIFIC AMERICAN? Employers will be doing their employés a great service by acting on this hint, and we feel sure that at the end of the year they will consider the investment a good one.

SUBSCRIBERS who wish to have their volumes bound, can send them to this office. The charge for binding is $1.50 per volume. The amount should be remitted in advance, and the volumes will be sent as soon as they are bound.

THE Index, the Patent Claims, and Advertisements occupy so much of the present issue, that we are obliged to defer the publication of several interesting letters and contributions until our next number.

SUBSCRIBERS who forward their subscriptions, may consider the receipt of the paper as evidence of payment, as we cannot undertake to acknowledge such payments by mail.

PERMANENT WAYS versus LIGHT TRAINS.

When houses are properly built the foundation is the first and most important consideration. If the "hard pan" is not reached piles are driven to give a proper foundation. So with all structures built by men and growing out of the earth, the foundation is the first and main object of concern. To secure this foundation, in any particular locality, is possible even under very adverse circumstances; but, although it is intended mainly to support a constant weight, not subject to frequent or extensive variations in amount, it is, not seldom, very costly. Where the imposed weight is liable to sudden and frequent change, either of increase or diminution, it has been found that a rigid structure is not so lasting as one possessing more or less elasticity. Such are bridges, especially those of a large span, and we always hear of the amount of deflection caused by a stationary or a passing load when a bridge is described.

Unyielding sub-structure for the rails of a road, would be very costly. To prevent displacement by atmospheric agencies —frost, heat, snow and rain—the bed or foundation would have to be settled and located below the reach of these disturbances. That this would be hardly possible, at whatever expense, is evident when the nature of the beds of our railroads are considered. They are cut through hills and dense forests, carried through swamps, and over causeways, the material being rock, loose stones, gravel, loam, soil, sand, and even decaying vegetation. Such materials, under such circumstances, cannot make a *permanent* way. A foundation of gravel, stone, mortar, and cement would be altogether too costly, and make railroads an impossible luxury. Substituting stone for wooden sleepers has been tried and failed. A portion, at least, of the Boston and Lowell railroad was laid with granite sleepers. Each sleeper became an anvil and the jar of the successive blows of the wheels was immensely injurious to the rolling stock, while the stone sleepers were broken by the frost or the percussion of the trains. "Shims" or cushions of wood were introduced between the rails and the stone sleepers and thus the difficulty was partially remedied. If a permanent or rigid way is to be attempted it is evident that either the support of the rails must be continuous, or the rails must be made much heavier, or higher, giving a longer vertical section than those at present used.

As at present constructed and used, railroads are costly enough; they are anything but permanent ways, and as making them so would seem to be financially difficult if not physically impossible, we must look to the reduction of the weight the rails are compelled to bear. Between the supports (sleepers) the rail is a stringer like that of a bridge, and subject, like that, to deflection, as anyone may see who notices the movement of a train, a locomotive, or a heavily loaded car. Why not reduce the weight of the locomotive and of trains, running trains oftener and nearer together? Is there any insuperable obstacles to this, and would it not be cheaper than to make a long road, passing over and through all sorts of soils and all descriptions of country, a permanent way? It seems to us that altogether too much attention has been devoted to the introduction if steel rails, steel tires, and improvements in the permanent way, and too little to the proper utilization of our roads as they now exist, or as they may be cheaply made to be. Let the road be properly ballasted, placing the sleepers two instead of three feet apart, and then replace the enormous thirty, forty, and fifty tun locomotives by those better adapted to the road, of course reducing the weight of the trains (and if necessary, of the cars), and we should hear less about accidents from broken and worn out rails, broken axles, and defective sleepers.

CONDITION OF THE PATENT OFFICE.

The Secretary of the Interior, in his annual report to Congress, states that during the year ending September 30, 1868, there were 20,112 applications for patents; 14,153 patents (including reissues and designs) were issued; 1,692 applications allowed on which patents did not issue owing to the non-payment of the final fee; 3,789 caveats filed; 180 applications for the extension of patents received, of which 133 were granted. The receipts were $696,786, being $171 less than the expenditures. The Secretary also renews his former suggestion in favor of repealing so much of the law as allows an appeal from the decisions of the Commissioner on applications for letters patent and in interference cases, and respectfully refers to the views on the subject presented in his former reports.

The Commissioner of Patents reports to the President of the Senate as follows:

By an act of Congress passed July 20, 1868, all the receipts of the Patent Office were directed to be paid into the Treasury, and the sum of $250,000 was appropriated to pay its expenses.

In pursuance of said act, I transmit herewith to Congress a detailed account of the receipts and expenditures of the Patent Office during the period from the passage of said act up to the commencement of the present month.

The payments of salaries and wages at the Patent Office are usually made at the end of each month. Those, therefore, that were paid after the 20th of July were for the services of the whole of that month.

The accounts of expenditures include about $35,000 paid for debts that had accrued before the commencement of the term. Other portions of such past indebtedness, amounting to about $27,000, still remain due and unpaid.

The Agricultural Department, during the past summer, has been removed from the Patent Office building. The fitting up of the rooms thus vacated, and furnishing them for the uses of the Patent Office have involved considerable expenditures beyond the ordinary expenses of the office.

Of the $250,000 appropriated by the act of July 20th, $43,490 remain unexpended. This sum, it is estimated, will about meet the expenditures of the present month.

The receipts of the Patent Office, since the 1st of July last, that have been collected and paid into the Treasury, exceed all its expenditures during the same period, ordinary and extraordinary, by the sum of $29,494 85.

THE VELOCIPEDE MANIA.

The excitement on the subject of velocipedes is on the increase, and improvements are being made every day. But inventors are not confining their genius to velocipedes to be used on land; a number of plans and models have been submitted to us for aquatic use, some of which possess much novelty.

A riding school for giving instruction in the art of riding and driving the two-wheeled velocipede has been opened in the large hall, 932 Broadway, where large numbers of gentlemen congregate every evening to receive instructions.

The sport of velocipede riding is very fascinating, and is becoming quite fashionable. It is likely to take the place of skating to a great extent. Persons may be seen practicing on our streets and avenues every afternoon. One gentleman in the country who does business in the city is said to have sold his horse and wagon and substituted the velocipede, on which he rides back and forth from the railroad station to his house every day. He claims that he goes quicker and without fatigue. He enjoys the exhilarating ride, and is delighted with the change. His oats are for sale and stable to rent. No more harnessing, shoeing, or horse feed required by this gentleman. Other incidents of interest on the new mania are deferred for lack of space this week.

HORSE AND FOOT.

From the above heading it might be inferred that we intend to write a military essay, but such is not the case. Our desire is simply to call attention to a nuisance, and to suggest a remedy. The nuisance to which we refer is this: In all our overcrowded cities, New York, for instance, all streets are free to vehicles of whatever character, and are also pedestrian thoroughfares. It is true the sidewalks are the exclusive prerogative of the pedestrians, but, as they are forced to cross other streets to get from block to block, the nuisance remains, to the peril of life and the utter despoilment of broadcloth and patent leather.

Nine tenths of all the accidents from collisions occur at crossings. This city employs a large number of policemen to assist ladies in fording rivers of filth and preventing them from being run down by reckless drivers. It is no uncommon sight, in the midst of sludge which winter always brings us, to see some shipwrecked daughter of Eve stranded upon some island of frozen filth in the middle of the street holding frantically to her soiled crinoline, her pretty gaiters filled with an ice-cold solution of high fertilizing value, and looking appealingly around to find somebody whose bravery and boots are sufficient for an attempt to rescue her. Meanwhile along come the omnibuses and express wagons, carts and trucks, whose drivers seem to take a malicious pleasure in bespattering her velvet cloak and her snow-white feathers, regardless of the feelings which wring her heart-strings, or the damage which wrings her husband's purse strings.

Now there is but one remedy for this uncivilized state of affairs. The horse must be separated from the foot. In order to effect such a separation we advocate first, the erection of a screen along the edge of the sidewalk next the street, the screen to consist of an iron frame, with a curtain of canvas that can be raised or lowered, to suit circumstances. In fair weather it would of course be unnecessary to keep it up, but in sloppy weather it would add greatly to the comfort of all who are compelled to pass through our principal thoroughfares. Second, the crossings should be tunneled. The experiment of the Fulton Street Bridge has proved that bridges are not the thing wanted. They require to be too high to accommodate the loaded vehicles and omnibuses, and for various other reasons are not tolerated. Tunnels at crossings, on the contrary, need not to be deep, and the steps leading into them can be made of easy grade. They can be lighted day and night with gas, for one-fourth the expense of keeping policemen to guard the principal crossings, and on the score of cleanliness are preferable to bridges. Their expense need not be much greater than bridges, but if it were five times as much we should still advocate them as the only feasible method of correcting the nuisance we have described.

CLEANLINESS IN SHOPS.

In our visits to different manufacturing establishments we are often shocked at the confusion and want of order which seems to prevail. Cleanliness, the virtue which has been said to rank next to godliness, seems to be entirely disregarded in many otherwise well conducted establishments. Now we regard order in the arrangement of tools, the avoidance of confusion attendant upon misplacement, and the frequent and thorough removal of the litter upon floors, as more important in an economical point of view, than with reference to the comfort and health of workmen, although the latter consideration is important enough.

The want of attention to this point is costing many a shop in this country more than is imagined. In one shop we visited lately we saw a workman search for a mislaid tool longer than it took him to use it after he found it. The incident did not seem an unusual one but one of ordinary occurrence, as we inferred from some remarks of the foreman, who saw the whole matter and even suggested some places where the missing tool might probably be found.

The floor of this shop was covered with a mass of useless lumber. The removal of any bulky object from one end of the shop to the other, would have necessitated a previous removal of rubbish to clear a way that would have consumed a considerable time. Such a slovenly state of things must inevitably breed carelessness on the part of employés, and greatly facilitate accidental misplacement of tools, nuts, and other small objects liable to be dropped. The reflexive effect upon hands, of strictly enforced order in the replacing of tools and cleanliness in a shop, is always in the highest degree beneficial and should never be overlooked by an intelligent foreman.

Nothing is more refreshing than to pass from one of these ill-regulated slovenly shops into one where order and cleanliness prevail. Even the workmen seem be more cleanly in their person and tidy in their attire, and to feel the elevating tendency of the discipline which prevails. Everything moves on quietly, rapidly, and surely to its accomplishment. No time or material is wasted. Everything is in its place when wanted and ready for use. A comparison of two such shops is a demonstration that there is no such thing as perfect manu-

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facturing economy when order and cleanliness are overlooked.

THE JONVAL VS. THE FOURNEYRON WATER-WHEEL.

It has long been a mooted question with both engineers and manufacturers whether the Jonval or the Fourneyron water wheel utilized the greater amount of power from a given quantity of water and fall. This problem seems to have been at last solved in a very satisfactory manner in favor of the Jonval turbine, as the accompanying letter from a disinterested party, prepared agreeable to contract, will show.

The wheels in question are from 125-to 150-horse power, and were expressly constructed to test the respective merits of the principle of which each is a type. The builders of the different wheels are well known to be eminent in the construction of the wheels they produce; and the builders of the beaten wheel—the Fourneyron—it is reasonable to suppose, used all their skill in the construction of the wheel upon which so much depended, hence the result must be attributed not to a faulty adaptation of, but to the principle itself.

We deem this a very important result; and as it is evidently no accidental or forced result, but a matter of deliberate contract and agreement between all the parties interested, the builders, as well as the users of the wheels, we take pleasure in calling the attention of engineers and manufacturers to it.

WILLIMANTIC, CONN., Oct. 31, 1868.

MUNN & Co: Gents—When our new thread mill was being constructed, we made a contract with Mr. J. P. Collins, of the Troy Turbine and Machine Works, to build one of his improved Jonval Turbine Water Wheels, to be tested with a Fourneyron or "Boyden" Turbine, as built by Messrs. Kilburn, Lincoln & Co., of Fall River, Mass.

The test was to be a comparative one, *i. e.*, each wheel to drive the same machinery, and the relative amount of water measured which each should require to do it.

About one year since, the builders of both wheels met here and, assisted by ourselves, conducted the test. Messrs. Kilburn, Lincoln & Co. were much dissatisfied with the result, and claimed that their wheel was badly injured by some sticks or stones getting into it. Upon this ground they claimed the privilege of putting in a new wheel, preparatory to another test. This request was granted them, and the final test was made on the 15th inst., both builders again being present.

The Fall River wheel drove 12 1-2 per cent more machinery than the Collins wheel, but in doing so required 38 99-100 per cent more water, thus leaving a result of over 23 per cent in favor of the Collins wheel (being about the same comparative difference as in former test). In the last test the water used by each wheel was measured over the same weir, the same depth being retained by contracting the ends. The gates were fully open in each test, and the Collins wheel was not changed after the first test.

Our contract with Mr. Collins was that we should give a certificate of the result, no matter which wheel should prove the best, for publication in your useful journal, and we now hereby comply with the same.

Yours, very truly,
WILLIMANTIC LINEN CO.
A. B. BURLESON, Agent.

THE TELESCOPE.---A LECTURE DELIVERED BEFORE THE AMERICAN INSTITUTE BY PROF. ALEXANDER.

Reported for the Scientific American.

The second lecture of the regular course of scientific lectures before the American Institute, was delivered on the evening of the 4th December, by Prof. Alexander of Princeton College.

The lecture was opened by an allusion to the figure in Bunyan's Pilgrim's Progress, in which the senses are considered as gates to the soul. The speaker dwelt in the most eloquent manner upon the beauty of the mechanism of the "eye gate," and the mysterious agent by which impressions of remote objects are conveyed to the mind.

He next proceeded to explain the mechanism of the telescope, that "artificial eye" bestowed upon man by optical science, illustrating this part of the subject with numerous diagrams. It is quite impossible to reproduce in a report of this kind this part of the lecture. One part, however, can be made clear to our readers. People often imagine the magnifying power of a telescope depends upon the size of its object glass. This is a mistake. An instrument with a small object glass may magnify as much as a larger one, the magnifying power depending upon the eye-pieces. The limit of the power of the eye-pieces which telescopes can carry, and give a distinct image, depends upon the object glass which determines the illuminating power. In other words, we behold objects clearly only when their size and illumination are together sufficient to produce a distinct impression upon the retina. The larger the object glass of a telescope is, the more light it will collect from objects towards which it is directed, and hence the advantage of large lenses.

The lecturer next dwelt briefly upon the early history of the telescope. Roger Bacon, in the thirteenth century, made use of such language with reference to what "may be performed by refracted vision," as to render it somewhat probable that he was at least acquainted with the theory of a refracting telescope, though there is no sufficient proof that he constructed one; and Baptista Porta is said by Wolfius to have made a telescope, but the description of the instrument given by the inventor is very defective, and the instrument, whatever it was, does not seem to have been used in any celestial observation. Indeed, we have no distinct evidence that such an instrument was used before the beginning of the seventeenth century. Descartes ascribes the invention of the telescope to James Metius (Jacob Adriansy) of Alkmaer in Holland; but Huygens, as well as Borellus, to John Lippensheim, or Lippersy (Hans Zans, or Jansen), a maker of spectacles, of Middleburgh. Prof. Moll, after an examination of official papers preserved in the archives of the Hague, comes to the conclusion that on the 17th of October, 1608, Jacob Adriansy was in possession of the art of making telescopes, but from some unexplained cause concealed it; and that on the 21st of the same month, Hans Zans, or Jansen, was actually in possession of the invention; but there is little reason to believe that it was devised by either him or his son Zacharias, though one of them invented a compound microscope about the year 1590.

One of the earliest of the telescopes made by the Jansens was presented to Prince Maurice, to be used in his wars. It was in April or May, 1609, that Galileo first heard of this, and the instrument was then described to him as one which had the property of making distant objects appear as though they were near. Galileo thereupon devised how that might be effected, and the next day, according to Delambre, was in possession of a telescope magnifying three times. Galileo's second telescope magnified about 18, and his third about 33 times.

The remainder of the lecture was an elegant and graphic description of some of the wonders of the heavens revealed to us by the telescope, and it was closed by a strong argument in favor of natural and revealed religion based upon the evidences of an intelligent Creator to be found in the study of the material universe.

THE MANUFACTURE OF IRON.---A NEW PROCESS.

A new process for manufacturing iron, which seems to give considerable promise, is now on its trial at one of the iron mills of Pittsburgh. The process obviates the necessity of puddling. The pigs of crude iron are melted, and, while in a fused state, a quantity of crushed ore is intermixed. The oxygen of the ore combines with the carbon of the crude iron. The mixed mass is called a pig bloom. Upon re-heating these pigs and squeezing them in the usual manner, and rolling, iron of a very good quality is obtained. More rolling is required than in the ordinary process, but notwithstanding this fact, the iron is produced, so it is claimed, at a saving of six dollars per tun over the old method.

Some specimens which we have seen tried, indicate that the iron is slightly red-short, but not so much so as to seriously impair its quality. When cold it is remarkably tough, enduring very severe tests of bending, twisting, and so forth. We have not obtained analyses of the ores used in the process and cannot therefore give any further details. We shall, however, watch the progress of this method, and hope at a future time to give a minute description of it.

The Siemens Furnace.

During a recent visit to Pittsburgh, our attention was called to the operation of one of the Siemens regenerative gas furnace, and we are satisfied that among the many modern advances in the manufacture of iron and steel, this deserves to rank among the most valuable. The furnace alluded to was applied to the melting of steel in pots, and we were told that the saving in fuel effected by it was enormous. It would be difficult to conceive how a more intense heat on so large a scale could be reached, than in one of these furnaces. The *American Railway Times* contains the following interesting facts in regard to this furnace, and its applications:

One of these furnaces used in Bolton, England, since November, 1867, in puddling iron, shows some remarkable results in competition with the ordinary puddling furnace, which may be summed up briefly as follows: an increase of from thirty-five to fifty per cent. in the amount of work done; greatly improved quality of the iron produced; great saving in the waste metal; and a saving of from twenty-four to fifty per cent in the amount of fuel used. When to these facts is added that the Siemens furnace will last much longer than the ordinary furnace, and that it occupies much less room, it makes out a pretty strong case in favor of its general adoption for puddling iron. The Siemens Furnace is now being rapidly introduced into the United States, for melting steel in pots, being used for this purpose at Nathan Washburn's works at Worcester, Mass., and at the works of Messrs. Anderson & Wood's, and Singer, Nimick & Co., of Pittsburgh, Pa., while several other furnaces are being built at other places for like purposes. In melting steel in pots it is found that one half tun of slack coal of poor quality, will melt one tun of steel in three hours, while the pots will last two melts more than by the old process. In Great Britain the manufacturers are now successfully using clay pots at the cost of about fifty cents each, while the lead crucibles commonly used, cost about three dollars each. These pots are now being introduced into Nathan Washburn's works, and in other steel works, and this item of economy is of no mean importance in favor of the Siemens furnace. It is found at the Lenox Plate Glass Works, at Lenox, Mass., that this furnace will melt the same mixture in nine hours, that in the old furnace it takes thirteen hours to melt. For heating iron and steel, the Siemens furnace is now used at the Nausha Iron Works, and the Renssalier Iron Works; and it is found that four hundred pounds of poor coal are found sufficient to heat one tun of iron. These furnaces are likewise now being erected for heating, melting, and puddling purposes, by the Washburn & Moen Manufacturing Company, by Messrs. Burden & Sons, by the Trenton Iron Works, by Messrs. James Wood & Sons, of Pittsburgh, the American Silver Steel Company, and by several other parties in different sections of the country.

Chemical Action of Light.

The interesting researches of Professor Tyndall as to the action of light on certain vapors and liquids may have no immediate effect upon the practice of photography, but it is impossible to say at what point in his discoveries a practical application may become obvious. Let us illustrate by a speculation upon the possibilities attending his recent discoveries. In his paper before the Royal Society he states that actinic light decomposes the vapor of nitrite and nitrate of amyl. Amyl is a radical analogous to ethyl and methyl, the hydrated oxide of amyl being known as fusel oil, as the hydrated oxide of ethyl is known as ethylic, or common alcohol, and the hydrated oxide of methyl is known as methylic alcohol. Fusel oil is known to be a common impurity in ordinary alcohol, and its presence in collodion has long been regarded as injurious, and conducive to fog, without any knowledge of the reason why it should produce mischief. Professor Tyndall's experiments suggest a series of possibilities. When fusel oil is in collodion, and comes in contact with nitric acid, either free in the bath or liberated by action of free iodine in the collodion, a trace of nitrate of amyl may be formed, and this body, being present in the film when exposed to the action of light, and possibly decomposed, would, under some circumstances, yield, as a product of decomposition, valerianic acid, a substance answering to acetic acid, as the product of the oxidation of common alcohol, or formic acid in methylic alcohol. Or, possibly, in the decomposition, intermediate bodies, analogous to acetone or aldehyde, might be formed, with a well-known tendency to produce fog when present in a collodion film. Such a series of possibilities exist, and might furnish a clue to the fogging action of fusel oil when present in collodion, which, arguing from ordinary analogies, ought not to be more inimical to success than the ordinary alcohol employed in the manufacture of collodion.—*Photographic News.*

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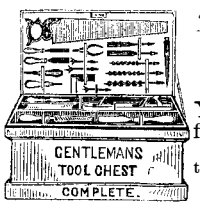

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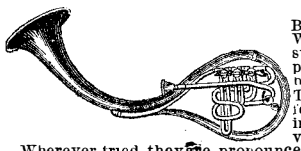

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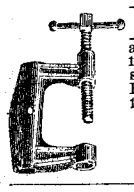

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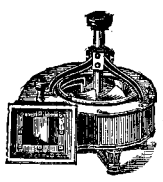

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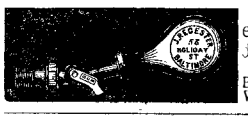

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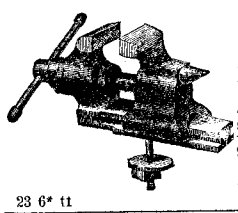

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